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ICONES PLANTARUM FORMOSANARUM

NEC NON ET

CONTRIBUTIONES AD FLORAM
FORMOSANAM.

AUCTORE

B. Hayata.

II.

3833

TO HIS EXCELLENCY COUNT SAMATA SAKUMA,
GOVERNOR GENERAL OF FORMOSA.

SIR,

I have the honour to submit to your Excellency the second fascicle of the "Icones Plantarum Formosanarum, nec non et Contributiones ad Floram Formosanam" by B. HAYATA, D. Sc.

KAKICHI UCHIDA,
CIVIL GOVERNOR OF FORMOSA.

May 10th, 1912.

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INTRODUCTION.

As this fascicle now goes to press, it occurs to me that a word as to the nature of the whole work may not be out of place. The original plan, as has been explained in the introduction to the preceding fascicle, was to publish in a long series, extending it might be over as many as fifteen years, a flora which should contain full descriptions of all plants found in Formosa. That plan, however, was slightly altered even in the first fascicle owing to the necessity of limiting in advance the number of pages so as not to exceed the grant made by the Government.

That first portion of the work contains an enumeration of plants from *Ranunculaceæ* to *Rosaceæ*, with descriptions of new or noteworthy plants, references to species (as far as accessible), and a key to the families, genera and species with their respective localities and geographical distributions. It had been my intention to pursue this altered plan in the case of this second fascicle; but soon after the manuscript was ready, I was informed of a further reduction of the grant, and this has compelled me to cut out nearly all references to species.

The present fascicle therefore, like the preceding one, contains a key to the families, genera, and species, and an enumeration of plants from *Saxifrageæ* to *Dipsaceæ* with their localities and geographical distributions; but the references to species are considerably limited. Descriptions are given only in the case of plants which are new or which I have not hitherto described. Of these plants such as have been worked up since last year and are now described by me for the first time, appear under the heading, "New or Noteworthy Plants of Formosa."

As to the total number of species recorded from the island, I may add that in the preceding fascicle it was stated to be 2660 species, belonging to 836 genera and 156 families. Since then just one year has elapsed. During that time I have secured many collections and a number of genera and new species have to be added to our Formosan flora. The genera to be added at this time together with a few that appeared in the Tokyo Botanical Magazine a few months ago, are given in the following table.

| | | |
|----------------------|--------------------|--------------------|
| <i>Gonocaryum</i> | <i>Cissus</i> | <i>Semecarpus</i> |
| <i>Pachysentria</i> | <i>Medinilla</i> | <i>Gilibertia</i> |
| <i>Litosanthes</i> | <i>Chimaphila</i> | <i>Erycibe</i> |
| <i>Blachia</i> | <i>Pachysandra</i> | <i>Sarcococca</i> |
| <i>Mitrastemon</i> | <i>Cremastra</i> | <i>Cypripedium</i> |
| <i>Ione</i> | <i>Listera</i> | <i>Oreorchis</i> |
| <i>Teniophyllum</i> | <i>Drymotanium</i> | <i>Peranema</i> |
| <i>Lecanopteris.</i> | | |

The species newly added or now to be added number as many as 47. Among these stands *Rafflesiaceæ* or *Mitrastemonaceæ*, a new family proposed by Mr. T. MAKINO, and represented in Formosa by *Mitrastemon Kawa-Sasakii* HAYATA. Thus up to the present date, the total number of the flora, so far as is known, is 2707 species, belonging to 858 genera and 157 families.

In conclusion, I avail myself of this opportunity to express my obligations to the officials of the Government of Formosa who have helped me in the collection of materials and in the publication of my work.

B. HAYATA.

Taihoku and Tokyo, September 10th, 1912.

43. Saxifragaceæ.

Conspectus of the Formosan Genera.

- (1) Herbs (Saxifragaceæ). (2)
 Shrubs or trees. (4)
- (2) Ovary 2-celled {leaves compound *Astilbe*. 1
 leaves simple *Saxifraga*. 1*
- Ovary 1-celled. (3)
- (3) Placentas parietal, alternate to the stigmas. (3*)
 Placentas parietal, opposite to the stigmas, scapes 1-flowered, petals
 5, staminodes prominent. *Parnassia*. 3
- (3*) Petals 5, pinnatifid, capsules not rostrate. *Mitella*. 2
 Petals 0. Capsules rostrate. *Chrysosplenium*. 2*
- (4) Leaves opposite, exstipulate, simple. Stamens double the number
 of petals or more numerous. Ovary inferior or half-superior.
 (Hydrangeæ). (5)
 Leaves alternate. Stamens equalling the petals in number. Ovary
 inferior or half-superior (Escalloniæ). *Itea*. 9
 Leaves alternate, simple. Ovary inferior, 1-celled. Seeds immersed
 in pulp (Ribesiæ). *Ribes*. 10
- (5) Filaments linear. (6)
 Filaments winged. *Dentzia*. 7
- (6) Stamens 8, 10 or 12. (7)
 Stamens indefinite. Petals 5, valvate. Styles 3, short. Leaves
 alternate. *Cardiandra*. 8
- (7) Petals coherent to a calyptra; leaves persistent. *Pileostegia*. 6
 Petals free, not connate. Leaves deciduous. (8)
- (8) Styles 2-4, free or slightly connate at the base. *Hydrangea*. 4
 Styles 1, stigma 4-9-lobed. *Schizophragma*. 5

1. *Astilbe* HAM.*Conspectus of the Formosan Species.*

(1) Flowers larger, in dense spike-like panicles, leaves nearly glabrous.

.....*A. macroflora*.

Flowers smaller, in looser panicles, leaves hirsute or nearly glabrous.

..... $\left\{ \begin{array}{l} \textit{A. longicarpa.} \\ \textit{A. chinensis.} \end{array} \right.$

Astilbe chinensis FRANCH. et SAV.; HAYATA Fl. Mont. Formos. p. 86.

HAB. Ganzan in the Morrison ranges.

DISTRIB. Amurland, Japan, and central and northern China.

There is a little doubt about this being *A. chinensis* FRANCH. et SAVAT.

Astilbe longicarpa HAYATA Mater. Fl. Formos. p. 106; Herb, nearly 1 m. high or higher, erect, stem glabrous. Radical leaves yet unknown. Cauline leaves long petiolate ternately pinnate, lateral leaflets ovate, terminal one acuminate ovate duplicately serrate, serras acuminate, petiolulate. Racemes 30 cm. long, base 12 cm. broad, pyramidal, racemules (lower ones) pedunculate, upper ones subsessile. Flowers shortly pedicellate, bracteolate at the base of calyx. Calyx $1\frac{1}{2}$ mm. long, lobes ovate truncate. Petals spathulately obovate nearly 1 mm. long, minutely apiculate at the apex, margin entire. Stamens 10, very much exserted, 2-times longer than the petals. Carpels 2, distinct. Fruits cylindraco-ovoid shortly rostrate, 4 mm. long including beaks.

HAB. Tappansha; Mt. Morrison.

Astilbe macroflora HAYATA Fl. Mont. Formos. p. 86, et Mater. Fl. Formos. p. 106. Herb, nearly 30 cm. high, erect, base with scales which are membranaceous, dark, broadly ovate, acuminate, numerous, obvallate. Rhizomes thick, with numerous fibers, stems and petioles dark hairy. Radical leaves and cauline ones ternately-bipinnate, petioles nearly equally long as the blades, long pilose at the nodes of the petioles, folioles ovate or oblong, base cordate, rarely slightly 3-lobed, 3 cm. long $2\frac{1}{2}$ cm. broad, sparingly hairy, above slightly pilose on the cost, biserrate, primary serratures larger shortly

acuminate, secondary ones minute setose, terminal leaflets long, but lateral ones shortly petiolulate, stipules membranaceous ovate acuminate dark erect. Racemes, with small floral leaves, 10 cm. long, base 5 cm. broad, pyramidal, rhachis dark-hirsute, bracts stipule-like erect. Flowers densely clustered towards the apex of peduncled racemules, shortly pedicelled. Calyx $3\frac{1}{2}$ mm. long campanulate, pubescent, lobes ovate obtuse 3 mm. long 3-nerved thick very much longer than tube. Petals spatulate 4 mm. long 1 mm. broad strongly exerted, margin minutely ciliate serrate, with 2-3 teeth on each side, diffused. Stamens 10, inserted on calyx-disc. Carpels 2, distinct. Fruits shortly beaked, beaks 5 mm. as long as carpels. Seeds scobiform oblique fusiform 1 mm. long.

HAB. Mt. Morrison.

1.* *Saxifraga* LINN.

Saxifraga sarmentosa LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 130.

HAB. Tamisui.

DISTRIB. Japan and Central China.

2. *Mitella* LINN.

Mitella japonica MIQ.; HAYATA Fl. Mont. Formos. p. 88.

HAB. Mt. Morrison.

DISTRIB. Japan, very common in the valleys of the lowland-hills. The distribution of the genus *Mitella* is rather limited, being found only in North America, Manchuria, East Siberia, Japan and Formosa.

2*. *Chrysosplenium* LINN.

Chrysosplenium sp. HAYATA Fl. Mont. Formos. p. 87.

HAB. Mt. Morrison.

3. *Parnassia* LINN.

Parnassia palustris LINN.; HAYATA Fl. Mont. Formos. p. 88.

HAB. Mt. Morrison.

DISTRIB. West Asia to Europe, and eastward to Japan; but not yet found in Central China.

4. *Hydrangea* LINN.

Key to the Formosan Species.

- (1) Leaves quite entire. (2)
 Leaves more or less serrate. (3)
- (2) Leaves elongately oblong nearly 20 cm. long. *H. integra*.
 Leaves shortly oblong, shortly cuspidate, less than 6 cm. . . *H. integrifolia*.
- (3) Leaves distinctly serrulate or serrate. (4)
 Leaves obscurely or remotely serrate, subentire or dentately serrate,
 quite glabrous. *H. chinensis*.
- (4) Leaves glabrous, ovately oblong; petaloidal sepals 4, entire, rounded,
 emarginate. *H. glabra*.
 Leaves hirsute lanceolate or oblong. (5)
- (5) Leaves elongately lanceolate. (6)
 Leaves ovate acuminate; petaloidal sepals 4, serrate.... *H. Kawakamii*.
- (6) Petaloidal sepals rounded obscurely serrate. *H. longifolia*.
 Petaloidal sepals oblong quite entire..... *H. angustisepala*.

Hydrangea angustisepala HAYATA Materials for a Flora of Formosa p. 107. *H. angustifolia* HAYATA Ic. Pl. Formos. Fasc. I. Pl. XXXII. Scandent shrub? Branches subglabrous downward, fusco-rubescant cinereo-tomentose upward. Leaves opposite, long oblong, or broadly lanceolate, 12 cm. long, 3½ cm. broad, serrate, serras ascendent, hispid above, villosely tomentose pallid beneath, petioles 1 cm. long. Cyme terminal 7 cm. long as broad, branches slightly tomentose. Marginal flowers sterile, long pedicellate, pedicels 1½ cm. long; sepals 4, petaloid, unequal, outer ones longer, obovate, 14 mm. long 6 mm. broad, acute at the base, margin obscurely dentate, inner ones smaller, 5 mm. long 3 mm. broad. Fertile flowers: sepals 5, lanceolate, 2 mm. long, tomentose, obtuse at the apex, petals 5, longer than sepal, long obovate obtus at the apex. Stamens 10, nearly 3 mm. long, anthers broadly orbicular, retused at both ends. Ovary nearly superior or half-superior, styles 2-3, 1½ mm. long.

HAB. Giran: Chūrei.

Remarkable for nearly superior ovary and very narrowed sepals of the fertile flowers. Somewhat near *Hydrangea Davidi* FRANCH., but differs from it by the more densely hairy leaves, peduncles, and longer sepals. Also near *H. Hemsleyana* DIELS from which this is distinguishable by the much elongate leaves.

Hydrangea chinensis MAXIM.; MATSUM. et HAYATA Enum. Pl. Formos. p. 131; HAYATA Fl. Mont. Formos. p. 89.

HAB. Mt. Morrison, Mt. Arisan, Goshōrin, Kōkei, Ōkaseki, Terasoyama.

DISTRIB. The Loo-choo islands and south central China.

Hydrangea glabra HAYATA Fl. Mont. Formos. p. 89, Pl. VI. Shrub scandent on a trunk of a large tree, branches quite glabrous, bark ashy dark. Leaves oblong, petiolate, petioles 3-times shorter than the blade, blade oblong 11 cm. long 7 cm. broad, acute at the apex, obtuse or acute at the base, margin serrate, serratures acute, quite glabrous on both surfaces. Cymes corymbose terminately branched, rhaches tomentose, at last glabrous. Flowers on outside sterile, sepals 4 petaloid broadly obovate, nervose, base shortly cuneate, rounded or truncate or emarginate at the apex, 15 mm. long 17 mm. broad. Flowers on inside fertile. Capsules depressingly globose truncate at the apex, slightly compressed laterally. Seeds oblong flattened, wings narrowed.

HAB. Mt. Morrison.

This plant is near *H. involuerata* SIEB.; but differs from it in having quite glabrous leaves and more expanded cymes; from *H. Kurokumii* in having entire sepals of radial flowers and broad wings of seeds.

Hydrangea integra HAYATA Fl. Mont. Formos. p. 90, Pl. VII. Shrub scandent on a trunk of a large tree, branches subglabrous, bark dark reddish. Leaves petiolate oblong-elliptical 22 cm. long, 8 cm. broad, acute or cuspidately acute, base obtuse or narrowed, entire, glabrous on both surfaces, blades 3-times longer than the petioles, petioles ferrugineous reddish. Cymes corymbose umbellately arranged, terminal, 14 cm. long, 15 cm. in diameter, rhaches tomentose subfloccose. Flowers on the outer side sterile, sepals 2, petaloid broadly rounded, strongly nerved, one smaller $1\frac{1}{2}$ cm. broad, the other larger 2 cm.

broad. Capsules hemispherical laterally compressed 3-4 mm. broad, calyx-limb obscure, style persistent, recurved at the apex. Seeds fusiform, striate.

HAB. Mt. Morrison, Mt. Arisan.

Somewhat resembles *H. integrifolia*, but easily distinguished by the narrowed base of the leaves.

Hydrangea integrifolia HAYATA in MATSUM. et HAYATA Enum. Pl. Formos. p. 131. Scandent shrub. Branches and petioles in dried specimen ferrugineo-rubescens, at first covered with a soft floccoso-tomentum, at last glabrous. Leaves opposite, petiolate, oblong, elliptical, acuminate or cuspidate, quite entire, glabrous on both surfaces, 5-6 cm. long, 3-3.5 cm. broad, petioles 2-3 cm. long. Cymes corymbose umbellately clustered, terminal 6-7 cm. long, base bracteate, bracts linear nearly 1 cm. long, margin ciliate. Exterior flowers sterile, sepals petaloid 2-3 nervose, nearly orbicular 7-8 mm. long, interior fertile patent. Calyx-tube adnate to the ovary, hemispherical; limb 4-dentate. Ovary inferior completely 2-celled; styles 2, free, stigma introrse. Capsules yet unknown.

HAB. Mt. Taitou.

Hydrangea Kawakamii HAYATA Fl. Mont. Formos. p. 90, Pl. VIII, Shrub scandent on a trunk of a large tree, branches tomentously pubescent, at last subglabrous, bark slightly ashy dark. Leaves tomentoso-hirsute, petiolate, petioles 3-times shorter than the blade, blades oblong ovate, nearly 14 cm. long, 7 cm. broad, acuminate at the apex, acute or rounded at the base, irregularly subbiserrate on the margin, serras aristately acute, above very scabrous sparingly hairy, beneath densely hairy. Cymes corymbose umbellately arranged, terminal, nearly 12 cm. long, 14 cm. in diameter, rachis tomentose. Flowers on outer circle sterile, sepals 4, petaloid, nervose nearly orbicular, 2 cm. long as broad, margin (except base and apex) serrate, serras acute, inside ones fertile. Capsules hemispherical slightly constricted at the apex, 10-costate, calyx-lobes persistent, acuminate, styles persistent very divaricate, slightly recurved at the apex. Seeds fusiform produced at both ends, lengthwise striate, crosswise reticulate between the furrows.

HAB. Mt. Morrison; Mt. Arisan.

Somewhat near *H. involuerata* Sieb.; but differs from it in its scandent habit and in having serrate sepals of radial flowers.

Hydrangea longifolia HAYATA Fl. Mont. Formos. p. 91. Shrub erect, branches tomentose, bark ashy-dark. Leaves shortly petioled, petioles 10 times shorter than the blades, blades oblong-lanceolate acuminate base obtuse, nearly 20 cm. long 4½ cm. broad, margin remotely serrulate, serrulas acuminate, scabrously pilose above, tomentose on the costa beneath. Cymes corymbose umbellately clustered, terminal, nearly 9 cm. long, 14 cm. broad, rachis tomentose. Exterior flowers sterile, sepals petaloid tomentose on both surfaces broadly orbicular, nervose, rounded at the apex, shortly contracted at the base, 17 mm. long as broad. Capsules hemispherical tomentose slightly compressed laterally, styles persistent, recurved at the apex. Seeds fusiform produced at both ends.

HAB. Taitō, Tōkyokusha.

Somewhat resembles *H. Kawakamii* HAYATA; but differs from it in having long lanceolate leaves, hairy capsules and entire hairy sepals of marginal flowers.

5. *Schizophragma* Sieb. et Zucc.

Schizophragma hydrangeoides Sieb. et Zucc. var. **Fauriei** HAYATA Mater. Fl. Formos. p. 106. Leaves entire or remotely serrulate, ovately orbicular, shortly acuminate at the apex, rounded at the base or subcordate, 8 cm. long 6.5 cm. broad, long petioled, petioles 6-7 cm. long.

HAB. Mt. Taitō.

I examined the type specimen of *S. integrifolia* FRANCHET in the Herbarium of the Jardin des Plantes in Paris, and found that my plant is very distinct from FRANCHET'S species.

6. *Pileostegia* Hook. f. et THOMS.

Pileostegia viburnoides Hook. f. et THOMS.; MATSUM. et HAYATA Enum. Pl. Formos. p. 132.

HAB. Tamsui, Urai.

DISTRIB. Khasia, and the Loo-choo island. (var.)

7. *Deutzia* THUNB.*Dichotomous Key to the Formosan Species.*

- Plant much stronger, larger. Leaves oblong or ovate acute at the apex, flowers
 $1\frac{1}{2}$ cm. long.....*D. taiwanensis*.
 Plant very much slender, flowers 8 mm. long, leaves oblong acuminate or
 cuspidate at the apex.....*D. kelungensis*.

***Deutzia kelungensis* HAYATA** Materials for a Flora of Formosa, p. 108.

Branches slender, ashy, terete, seemingly scandent, branchlets slender, angulate, slightly stellately pubescent. Leaves opposite, ovately oblong, or ovately lanceolate, 8 cm. long, 3 cm. broad, acuminate at the apex, or acuminately acute or obtuse, base roundly obtuse or acute, margin serrulate, serrulas short, very shortly apiculate, scabrous above, stellately pubescent, costas and veins slender, pallid beneath, densely or sparingly beset with stellate hairs, costas and lateral veins prominent beneath, petioles 6 mm. long, sulcate above, transversely striate on the stem between the opposite petioles. Panicles terminal or axillary at the apex of branchlets, 6 cm. long, few-flowered, pedicels 2 mm. long, bracts minute subulate. Calyx campanulate more or less stellately pubescent outside, 3 mm. long, lobes patent triangular, obtuse or acute $1\frac{1}{2}$ mm. long 2 mm. broad, deciduous. Petals 5-6, duplicately valvate, erect, or erecto-patent, oblong, $8\frac{1}{2}$ mm. long, 4 mm. broad, subacute at the apex, base broadly truncate, margin plicate, more or less pubescent or subglabrous. Stamens 10-12, some longer, some shorter, longer ones 7 mm. long, filaments dilated 6 mm. long, 1 mm. broad, apex obtusely ob-sagittately attenuate. Disc annular, entire. Style 4, distinct, slightly 2-lobed at the apex, stigmatosis. Capsules subglobose $3\frac{1}{2}$ mm. long, 4-lobate, septicideally dehiscent in 4 cocci. Seeds numerous, fusiformed, laterally slightly compressed, winged at both ends.

HAB. Kelung: Zuihō.

***Deutzia taiwanensis* HAYATA** Materials for a Flora of Formosa p. 109, and Ic. Pl. Formos. Fasc. I. Pl. XXXIII. Shrub, branches pubescent, albo-punctate. Leaves opposite, ovate or oblong, 10 cm. long,

5 cm. broad, subentire remotely obscurely mucronate-crenate, pale-greenish above, minutely punctate-lepidote, very much paler and albo-lepidote beneath, primary veins 6-7 on each side, connivent near the margin, very scabrous on both surfaces, cuspidately acute or obtuse at the apex, or obtuse at the extremity, rounded at the base. Panicles terminal, 15 cm. long 6 cm. broad, pyramidal, or racemose axillary. Calyx punctate broadly campanulate, obscurely 5-sulcate, 4 mm. long, 7 mm. in diameter, 5-lobate, lobes broadly triangular 2 mm. long 3 mm. broad shortly acute. Petals 5, valvate, angustate, 12 mm. long, 5 mm. broad, acute at the apex, lamellate on the margin. Stamens 10, 2-seriate, outer ones longer, $12\frac{1}{2}$ mm. long, filaments 11 mm. long, narrowed, nearly 1 mm. broad, apex 2-dentate, abruptly contracted above the teeth. Anthers orbicular, retused at both ends. Styles 5, 11 mm. long, capitellate at the apex.

Deutzia crenata SIEB. et ZUCC. δ . *Taiwanensis* MAXIM. Hydrang. Asia. Orient. p. 23.

Deutzia scabra HAYATA in MATSUM. et HAYATA, Enum. Pl. Formos. p. 92, (pro parte).

HAB. Akō : Tanashū ; Taitō : Bokusekikaku, Suibi, Kachimro, Kōtōshō ; Giran : Hachirisha.

The present plant is very near *D. scabra* THUNB. and *D. pulchra* VIDAL ; but differs from the former in having dentate stamens and in the number of styles which is usually 5 ; from the latter, in having quite obtuse leaves. In VIDAL's plant, the leaves are usually more acuminate, and very acute at the apex. *Deutzia crenata* SIEB. et ZUCC. δ . *Taiwanensis* MAXIM. written in "MAXIM. Hydrang. Asia. Orient. p. 23" may possibly be identical with this plant, though I have found many different points between the description of MAXIMOWICZ and that of the present one ; for the *Deutzia* credited in Formosa by MAXIMOWICZ, as is considered from the locality given by him, may not be otherwise than the present one, as this is the only plant to be found in the lowland of Formosa. The plant written in the paper above cited is not near *D. crenata* SIEB. et ZUCC., nor is it referable to a variety of that species ; but must be a quite different one, so far as the diagnosis is concerned. As far as I can judge from the description of the variety δ . *Taiwanensis*,

it is so very different from *D. crenata*, that it is quite proper to raise it up to a specific rank. The fruits of the present plant are very similar to those of HENRY's specimens at Kew.

8. *Cardiandra* SIEB. et ZUCC.

Cardiandra formosana HAYATA, in Tōkyō Bot. Mag. XX. p. 55; and Mater. Fl. Formos. p. 107.

Cardiandra sinensis HAYATA Fl. Mont. Formos. p. 92, (non HEMSL.).

HAB. Tappansha.

9. *Itea* LINN.

Dichotomous Key to the Formosan Species.

- (1) Leaves narrowly lanceolate or oblong, thinner. Flowers smaller, relatively broader petals; puberulous capsules.....*I. parviflora*.
 Leaves oblong, thicker; glabrous capsules..... $\left\{ \begin{array}{l} I. chinensis. \\ \text{var. subserrulata.} \end{array} \right.$

Itea chinensis HOOK. et ARN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 133.

HAB. Taihoku, Kōketsusan, Kelung, Shintengai, Taiton, Hokuto, Kinsshaku.

DISTRIB. Loo-choo, Hongkong, China, Khasia.

Itea chinensis HOOK. et ARN. var. **subserulata** MAXIM.; MATSUM. et HAYATA Enum. Pl. Formos. p. 133.

Itea parviflora HEMSL. Ann. Bot. IX. p. 154; MATSUM. et HAYATA Enum. Pl. Formos. p. 133.

HAB. Bankinsing, Kōshūn, Kuraru.

10. *Ribes* LINN.

Ribes formosanum HAYATA Fl. Mont. Formos. p. 93. Shrub, branches angular, spines infra-axillary ternate very patent. Leaves simple plicate on nerves, broadly rounded truncate at the base or cordate, 2½ cm. long, 5-6-lobed, lobes obtuse, a few grossly serrate, petiolate, petioles sparingly glandulose-

setose as long as the blade. Flowers subsolitary, pedicels 1 cm. long base bracteate articulate on the middle, 2-4-bracteolate. Calyx-tube ovate adnate to the ovary, lobes 5 subpatent 1 cm. long, oblong-ovate rounded at the apex, 3-times longer than petals. Petals 5 inserted on the throat of calyx, oblong, small, scale-like, included, 4 mm. long. Stamens 5, 4 mm. long, anthers oblong. Ovary inferior, 1-celled, ovule numerous, placentas 2, parietal; styles 2, distinct slightly connate at the base, stigma simple. Berry globose roseous, pulpose 10-8 mm. in diameter, sepals persistent. Seeds subangulate, testa outside gelatinose, inside crustaceous, 3 mm. long, slightly compressed minutely reticulated.

HAB. Mt. Morrison.

44. Crassulaceæ.

Conspectus of the Formosan Genera.

- | | | |
|-----|-------------------------------------------|-----------------------|
| (1) | Petals connate, at least at the base. (2) | |
| | Petals free. | <i>Sedum.</i> 3 |
| (2) | Calyx shortly 4-fid. | <i>Bryophyllum.</i> 1 |
| | Calyx 4-partite. | <i>Kalanche.</i> 2 |

1. *Bryophyllum* SALISB.

Bryophyllum calycinum SALISB.; MATSUM. et HAYATA Enum. Pl. Formos. p. 134.

HAB. Shintiku, Biōritsu, Kōkwanshō, Taihoku, Tamsui.

DISTRIB. Tropical Africa; widely diffused in the warm regions.

2. *Kalanchoë* ADANS.

Key to the Formosan Species.

- (1) Plant smaller, less than 25 cm. high, leaves deeply trifid. . . *K. gracilis*.
 Plant far larger than the preceding, leaves entire spatulate.
 *K. spatulata*.

Kalanchæ gracilis HANCE; MATSUM. et HAYATA Enum. Pl. Formos.
p. 134; HAYATA Mater. Fl. Formos. p. 111.

A very slender herb, nearly 20 cm. high, erect; radical leaves triparted, terminal segment trilobed, $2\frac{1}{2}$ cm. long, 1 cm. broad, trilobulate, lobules lanceolate, obtuse at the apex, lateral segments linear-lanceolate as long as the terminal one, divaricate nearly at the right angle to the terminal one; petioles 5 mm. long; cauline leaves a very few, opposite, linear, simple or triparted; cymes terminal, rachis ternate very few-flowered; flowers yellow $2\frac{1}{2}$ cm. long, $1\frac{1}{2}$ cm. in diameter; sepals lanceolate 5 mm. long; petals $2\frac{1}{2}$ cm. long, acute at the apex.

HAB. Takow.

DISTRIB. An endemic plant.

Kalanchœ spathulata DC.; MATSUM. et HAYATA Enum. Pl. Formos. p. 134.

HAB. Kelung, Shintiku.

DISTRIB. Southern China, Australia, Burma and Java

3. *Sedum* LINN.

Key to the Formosan Species.

(1) Flowers in contracted cymes; leaves smaller spathulately oblong.

.....*S. morrisonense*.

Flowers in spreading cymes; leaves larger obovately round or more or less spathulate,*S. formosanum*.

Sedum formosanum N. E. BR.; MATSUM. et HAYATA Enum. Pl. Formos. p. 135.

HAB. Kōtōshō, Kelung.

DISTRIB. Loo-choo.

Sedum morrisonense HAYATA Mater. Fl. Mont. Formos. p. 94. Perennial, erect, nearly 8 cm. high, branched from the base, glabrous. Leaves approximate densely arranged closely imbricate, thick carnose, oblong-lanceolate, apex obtuse, base $\frac{1}{2}$ mm. produced beyond the insertion, 6 mm. long $1\frac{1}{2}$ mm. broad or broader. Cymes 3-fid many-flowered, bracteate, bracts leaf-like shorter than flowers; flowers sessile on the branches of cyme, small, 7 mm. long, campanulate. Sepals oblong-

linear obtuse, one half as long as petals, thick. Petals oblong-acute obtuse at the apex, shortly carinate, $6\frac{1}{2}$ mm. long; stamens (episepals) as long as petals, a little shorter than anthers, anthers oblong; scales hypogynous, minute broadly quadrate. Follicles membranaceous base shortly connate erect or patent, oblong, with styles 6 mm. long, stigma point-shaped. Seeds oblong obscurely striate, strias very minutely muriculate.

HAB. Mt. Morrison.

45. Droceraceæ.

Drosera LINN.

Key to the Formosan Species.

- (1) Leaves linear. *D. indica*.
 Leaves cuneately spatulate. (2)
 (2) Styles 5, not divided. *D. Burmanni*.
 Styles 3, bifid. *D. Lourerii*.

Drosera Burmanni VAHL.; MATSUM. et HAYATA Enum. Pl. Formos. p. 135.

HAB. Taihoku, Tamsui, Senton.

DISTRIB. Hongkong, China, India, Australia.

Drosera indica LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 136.

HAB. Siataw, Biōritsu.

DISTRIB. Tropical Asia, Africa, Australia, Japan.

Drosera Lourerii HOOK. et ARN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 136.

HAB. Senton, Pachina, Taiheishō, Taiton.

DISTRIB. Hongkong, Philippines and Loo-choo.

46. Hamamelideæ.

Conspectus of the Formosan Genera.

- (1) Ovary-cells 1-ovuled. (2)
 Ovary-cells many-ovuled. *Liquidambar*. 3
 (2) Petals 0. *Distylium*. 1
 Petals scale-shape. *Eustigma*. 2

1. *Distylium* SIEB. et ZUCC.

Distylium racemosum SIEB. et ZUCC.; MATSUM. et HAYATA Enum. Pl. Formos. p. 136.

HAB. Garambi, Kōshūn, Kurara.

DISTRIB. Japan, Loo-choo, Hongkong.

2. *Eustigma* GARDN.

Eustigma oblongifolium GARDN. et CHAMP.; MATSUM. et HAYATA Enum. Pl. Formos. p. 137.

HAB. Hokkōkei, Shōhakurin, Horisha, Mountains of Akōchō.

DISTRIB. Hongkong.

3. *Liquidambar* LINN.

Liquidambar formosana HANCE; MATSUM. et HAYATA Enum. Pl. Formos. p. 137.

HAB. Pachina, Shinkōshō, Taitō, Murimuribusssha, Hinan, Shintengai, Kōkei, Tamsui; Mountains in Nantōchō.

DISTRIB. Japan, Central China.

47. Halorageæ.

Conspectus of the Formosan Genera.

- (1) Terrestrial. Flowers all sessile or subsessile, stamens 8. . . *Haloragis*. 1
 Aquatic. (2)

- (2) Stamens 8 or 4. Styles 4. Seeds 4.....*Myriophyllum*. 2
 Stamen 1. Styles 2. Seeds 4.....*Callitriche*. 3

1. *Haloragis* FORST.

Haloragis micrantha R. BR.; MATSUM. et HAYATA Enum. Pl. Formos. p. 138.

HAB. Ganzan, Arisan, Taihoku, Kinpori.

DISTRIB. India, Malay, Australia, New Zealand, China throughout and Japan.

2. *Myriophyllum* LINN.

Myriophyllum spicatum LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 138; Fl. Mont. Formos. p. 95.

HAB. Kagi: Rokuryōsho, Shintiku, Tamsuiki.

DISTRIB. Generally spread over the cool and temperate regions of the Northern Hemisphere.

3. *Callitriche* LINN.

Callitriche stagnalis SCOP.; C. B. CLARKE in HOOK. f. Fl. Brit. Ind. II. p. 435; HAYATA Mater. Fl. Formos. p. 111.

HAB. Tamsui.

DISTRIB. Europe, North Asia, India, Tropical Africa, Malay, Australia and New Zealand.

48. Rhizophoreæ.

Conspectus of the Formosan Genera.

- Petals 4, entire. Stamens 8. Ovary 2-celled.....*Rhizophora*. 1
 Petals 5-6, lacerate. Stamens ∞ . Ovary 1-celled.*Kandelia*. 2
 Petals 6-14, 2-fid. Stamens 16-28. Ovary 2-4-celled.*Bruquiera*. 3

1. *Rhizophora* LINN.

Rhizophora mucronata LAM.; MATSUM. et HAYATA Enum. Pl. Formos. p. 140.

HAB. Ringaryō, Takow.

DISTRIB. Malay, India, Africa and Australia.

2. *Kandelia* W. et ARN.

Kandelia Rheedii W. et ARN. ; MATSUM. et HAYATA Enum. Pl. Formos.
p. 139.

HAB. Ringaryō, Kōketsuzan, Kelung, Tamsui, Takow.

DISTRIB. On the sea shores of the Tropics.

3. *Bruguiera* LAM.

Bruguiera cylindrica BLUME; MATSUM. et HAYATA Enum. Pl. Formos.
p. 139.

HAB. Sankiseki, Kelung, Takow.

DISTRIB. Sea shores of Tropical Asia.

49. Combretaceæ.

Conspectus of the Formosan Genera.

- | | | | |
|-----|---------------------------------------------------------|---------------------|---|
| (1) | Petals 0. Calyx-limb deciduous. | <i>Terminalia</i> . | 1 |
| | Petals 5-4. (2) | | |
| (2) | Calyx-limb persistent, growing with the mangroves. | <i>Lumnitzera</i> . | 2 |
| | Calyx-limb deciduous. | <i>Quisqualis</i> . | 3 |

1. *Terminalia* LINN.

Terminalia Catappa LINN. ; MATSUM. et HAYATA Enum. Pl. Formos.
p. 141.

HAB. Kōshūn, Takow and other places.

DISTRIB. Bonin, Loo-choo, Malay. Widely diffused in the Tropics.

2. *Lumnitzera* WILLD.

Lumnitzera racemosa WILLD. ; MATSUM. et HAYATA Enum. Pl. Formos.
p. 141.

HAB. Takow.

DISTRIB. Loo-choo, Malaya, Ceylon, Tropical Africa, Polynesia, Northern Australia.

3. *Quisqualis* LINN.

Quisqualis indica LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 140.

HAB. South Cape, Kōshūn, Kuraru.

DISTRIB. Tropical Asia.

50. Myrtaceæ.

Conspectus of the Formosan Genera.

- Ovary 2- or more-celled. Fruit a berry or drupe. Leaves opposite gland-dotted. (Myrtæ). (1)
- Ovary 2- or more-celled. Fruit fibrose berry. Leaves alternate, not gland-dotted. (Leecythideæ).....*Barringtonia*. 5
- (1) Limb of calyx closed in bud, with the lobes subimbricate, rather deeply valvately divided when in flower.*Psidium*. 1
- Limb of calyx 4-5-lobed or parted in bud, not becoming further divided when in flower. (2)
- (2) Ovary 1-3-celled with double rows of ovules in each cell, separated by spurious partitions. Leaves 3-nerved.....*Rhodomyrtus*. 2
- Ovary 5- rarely 4-celled with 2-3 ovules in each cell. Embryo long and narrow, curved, circular, or spherical, with small cotyledons.....*Decaspermum*. 3
- Ovary 2-3-celled with several ovules in each cell and without spurious partitions. Embryo thick and fleshy, not divisible or with 2 thick fleshy cotyledons and a short radicle.....*Eugenia*. 4

1. *Psidium* LINN.

Psidium Guyava LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 142.

HAB. Takow, Taihoku, Taichū, Pachina and many other places, mostly cultivated.

DISTRIB. Native of America.

2. *Rhodomirtus* DC.

Rhodomirtus tomentosa WIGHT; MATSUM. et HAYATA Enum. Pl. Formos. p. 142.

HAB. Keling, Taichokusan, Pachina, Shinkō, Manyama.

DISTRIB. Loo-choo, Hongkong, China, Philippines, Malaya, India.

3. *Decaspermum* FORST.

Decaspermum paniculatum KURZ; MATSUM. et HAYATA Enum. Pl. Formos. p. 144.

HAB. Kōshūn, Botansha, Kusukusu.

DISTRIB. Java, Philippines and Australia.

4. *Eugenia* LINN.

Dichotomous Key to the Formosan Species.

- (1) Leaves lanceolate nearly 15 cm. long. (2)
 Leaves nearly oblong or ovate, less than 5 cm. long. (3)
- (2) Leaves much larger and broader not dotted. *E. javanica*.
 Leaves much narrower minutely dotted. *E. Jambos*.
- (3) Leaves obovate quite round at the apex; flowers in a dense cyme,
 pedicels incrassate. *E. kashotensis*.
 Leaves more or less acute, but obtuse at the top. (4)
- (4) Primary lateral veins distinctly elevated on both surfaces. *E. formosana*.
 Primary lateral veins not elevated. (5)
- (5) Calyx-lobes obtuse. *E. sinensis*.
 Calyx-lobes acute; leaves much narrower. *E. acutisepala*.

Eugenia acutisepala HAYATA Materials for a Flora of Formosa, p. 112, and Ic. Pl. Formos. Fasc. I. Pl. XXXV. Branches slender, bark ashy pubescent, gradually solute, branchlets leafy, tetragonous, subulate. Leaves opposite elonga-

tely oblong, $4\frac{1}{2}$ cm. long, $1\frac{1}{2}$ cm. broad or broader, obtuse at the apex, cuneately at the base, reaching the petioles which are 8 mm. long, entire, chartaceo-coriaceous, rubescent when dried, shining above, pale beneath, costa impressed above, prominent beneath, margin slightly revolute, lateral veins slender, straight reaching the margin, connected by a marginal nerve, petioles 8 mm. long, sulcate above. Flowers cymose, cymes terminal at the apex of branchlets, or axillary, 3 cm. long, ternately branched, pedicels 3 mm. long, bracts subulate, bracteoles 2, opposite narrowed 1 mm. long, at the base of the calyx. Calyx elongately obconical, 4 mm. long, 3 mm. broad, articulated with pedicels at the base, punctate, narrowed at the base, lobes 4, minutely triangular, acute, $\frac{3}{4}$ mm. long, 1 mm. broad. Petals 4, rounded, 2 mm. long, more or less connate in calyptra, soon falling. Stamens 20-25, filaments terete 3 mm. long, anthers cordate, $\frac{1}{4}$ mm. long. Style simple, 4 mm. long, truncate at the apex, stigmatic. Ovary 2-celled.

HAB. Exact locality is not given.

This differs from *E. sinensis* HEMSLE. in having acute calyx-lobes, and in many other points.

Eugenia formosana HAYATA Materials for a Flora of Formosa, p. 113, and Ic. Pl. Formos. Fasc. I. Pl. XXXVI. Branches slender, glabrous, ashy, branchlets opposite. Leaves opposite petiolate, oblong or obovate, 6 cm. long 27 mm. broad, abruptly acuminate at the apex, or acute, obtuse at the extremity, gradually narrowed at the base, coriaceous, glabrous, shining above, pallid beneath, petioles 12 mm. long. Flowers cymosely paniculate, panicles terminal or axillary 5 cm. long, 3 cm. broad, branches furcate, or ternately branched, bracts and bracteoles minute, flowers shortly pedicellate. Calyx-tube 1 mm. long, blade campanulate, $1\frac{1}{2}$ mm. long, 3 mm. in diameter, truncate, lobes obsolete. Petals strongly imbricate, orbicular, 2 mm. in diameter, more or less connate in calyptra, deciduous. Stamens ∞ , many seriate 5 mm. long, filaments distinct patent. Ovary connate to the calyx-tube, styles $3\frac{1}{2}$ mm. long.

HAB. Kōshūn, Kinsukun.

Near *Eugenia cymosa* LAM.; but differs from it by the obovate, but not caudate, leaves. The leaves of *E. cymosa* are generally oblong.

Eugenia Jambos LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 143.

HAB. Pachina, Soobonslia, Taihoku, Kentanzan, Takow, Bankinsing, and many other places, mostly cultivated.

DISTRIB. Generally cultivated in Loo-choo, Hongkong, China, Australia, and India.

Eugenia kashotensis HAYATA Materials for a Flora of Formosa p. 113. Branches congested, bark ashy reddish. Leaves opposite, shortly petiolate, oblong or oblanceolate, $3\frac{1}{2}$ cm. long, $2\frac{1}{2}$ cm. broad, rounded at the apex, acute or attenuate at the base, coriaceous, petioles 2–3 mm. long. Cymes terminal 4 cm. long as broad, branches shorter opposite, congested, approximate, pedicels 3 mm. long. Calyx-tube 3 mm. long, limb campanulate, truncate, (lobes obsolete) 3 mm. long, $4\frac{1}{2}$ mm. in diameter. Petals 4, connivent, more or less connate in calyptra, deciduous, unequal, orbicular, smaller ones 2 mm. long, larger ones 3 mm. long. Stamens ∞ , many-seriate, distinct, filament filiformed, unequal, longer ones 7 mm. long, erecto-patent. Ovary connate to calyx-tube, style 3 mm. long.

HAB. Kashōtō.

Near *E. congesta* MERRILL; but differs from it in having terminal cymes and pedicelled flowers.

Eugenia javanica BLUME.

Eugenia maluccensis HAYATA in MATSUM. et HAYATA Enum. Pl. Formos. p. 143, (non LINN.).

HAB. Taichū and other places, cultivated.

DISTRIB. Java.

Determined by Mr. T. KAWAKAMI at Bentenzorg during his trip to Java.

Eugenia sinensis HEMSLE.; MATSUM. et HAYATA Enum. Pl. Formos. p. 143; HAYATA Fl. Mont. Formos. p. 96 (?).

HAB. Kelung, Shōhokurin, Kōshūm, Kusukusu, Kuraru.

DISTRIB. Bonin, Loo-choo, Hongkong, Central China.

5. *Barringtonia* FORST.

Dichotomous Key to the Formosan Species.

Leaves entire, racemes erect *B. speciosa*.
 Leaves crenato-denticulate, racemes pendulous *B. racemosa*.

Barringtonia racemosa BLUME; MATSUM. et HAYATA Enum. Pl. Formos. p. 144.

HAB. Taihoku, Kelung, Kaapan.

DISTRIB. Loo-choo, Malaya, India and Polynesia.

Barringtonia speciosa FORST; MATSUM. et HAYATA Enum. Pl. Formos. p. 145.

HAB. Exact locality is not known to me. The fruits of this tree are found abundantly on the coast of Kōtōshō island. They are, perhaps, carried to by waves from the Philippines. I have seen a single example at Kankaw near Kōshūn. It is questionable, however, whether it is really wild or not.

DISTRIB. Malaya, India, Polynesia.

51. Melastomaceæ.

Conspectus of the Formosan Genera.

- Ovary 3-6-celled, ovules very many, placentas radiating from the axis. Seeds very many. Anthers opening by a single terminal pore
 (Melastomeæ). (1)
- Ovary 4-5 celled, ovules very many, parietal or nearly basal placentas. Seeds very many. Anthers short opening by slits. Fruit baccate.
 (Astronieæ) *Astronia*. 7
- (1) Seeds curved through half a circle, minutely punctate
 (Osbeckieæ). (2)
- Seeds straight, oblong or cuneate, raphe often excurrent. Ovary with the vertex usually free conical. Fruit capsular.
 (Oxysporeæ). (3)
- Seeds straight; oblong or cuneate, often angular, raphe sometimes excurrent. Ovary flattened or depressed at the vertex. Fruit capsular. (Sonerileæ) *Sarcopyramis*. 6
- (2) Stamens all alike. Fruit capsular. *Osbeckia*. 1
- Stamens very unequal. *Melastoma*. 2
- (3) Inflorescence terminal, anthers 8 unequal, connectives 2-setosed at the apex. *Barthea*. 3

Inflorescence axillary. (4)

- (4) Anthers 4, unequal, connectives not appendiculate. *Blastus*. 4
 Anther 4, unequal, larger ones 2-lobed at the apex. *Bredia*. 5

1. *Osbeckia* LINN.

Dichotomous Key to the Formosan Species.

Flowers congested at the apex of the stem and usually afforded with a whirl of leafy bracts. *O. chinensis*.

Flowers shortly pedicelled, without any whirl of leafy bracts. . . . *O. scaberrima*.

***Osbeckia chinensis* LINN.; MATSUM. et HAYATA** *Emm.* Pl. Formos. p. 145.

HAB. Taito, Suibi, Gilan, Holisha, Senton.

DISTRIB. Japan, Loo-choo, Hongkong, China, India, Malaya, Australia.

***Osbeckia scaberrima* HAYATA** *Materials for a Flora of Formosa*, p. 115.

Branches strigose, cinerascent, straight, terete, slender, hairs strigose, adpressed, strigoso-barbate at the apex of the branchlets. Leaves opposite, elongato-oblong, or lanceolate-ovate, 4 cm. long, 13 mm. broad, obtusely acute at the apex, rounded or acute at the base, quite entire, 5-nerved, glabrous above only on the costa, otherwise adpressingly strigose, hairs regularly arranged on areas between the nerves, but beset with stronger longer hairs (1 mm. long) on marginal areoles, adpressedly ciliate on the margin, beneath pallid, sparingly slightly strigose, but much more strigose on nerves, petioles 4 mm. long, strigose. Flowers cymose, cymes 3-5-flowered, 2 cm. long. Calyx-tube subglobose, 6 mm. long, strigose outside, lobes ovately triangular acuminate, 5 mm. long, 2½ mm. broad, strigose on the middle, otherwise glabrous, margin strigoso-ciliate, glabrous inside, long aristate between the lobes, aristas very strong, tumid at the base. Petals rounded, margin ciliolate. Stamens nearly 15, inserted on the throat of the calyx, 6 mm. long, filaments slightly complanate, 3½ mm. long, anthers linear, 2¼ mm. long, ½ mm. broad, one-pored at the apex, connectives produced at the base, articulated with filaments. Ovary half-inferior, 5-celled, hirsute at the apex. Style simple, 6 mm. long, truncate and stigmatic at the apex.

Osbeckia aspera HAYATA *Fl. Ment. Formos.* p. 97 (non BLUME).

HAB. Mt. Morrison.

Near *O. aspera* BLUME, but differs from it in having shorter spherical capsules and much more scabrous leaves.

2. *Melastoma* BURM.

Melastoma candidum DON; MATSUM. et HAYATA Enum. Pl. Formos. p. 146.

HAB. Pachina, Kussaku, Shintengai, Maruyama, Senton, Tamsui, South Cape, Kōshūn, Kusukusu, and every where in the islands.

DISTRB. Loo-choo, Hongkong, China.

3. *Barthea* HOOK. f.

Barthea formosana HAYATA Fl. Mont. Formos. p. 97. Shrub scandent branched, branches very slender glabrous or in very young ones glanduloso-lepidote under microscope. Leaves shortly petioled, petioles 10-times shorter than the blades, blade subcoriaceous, young ones membranaceous, oblong, nearly 10 cm. long 3 cm. broad, obliquely caudato-acuminate at the apex, (tails linear), acute and equal at the base, margin subentire or remotely obscurely serrulate, 3–5-nerved, above under lense minutely sparingly setulose, beneath pallid, veins prominent, under microscope minutely and densely lepidote. Flowers terminal at the apex of the branches, 1–3-congested, larger, patent, 3 cm. in diameter, shortly pedicelled, pedicels 3–4 mm. long, minutely lepidote. Calyx-tube very glabrous obpyramidal or campanulate 9 mm. long, tetragonal limb dilate 4-lobed, lobes shorter triangular setoso-carinato-acuminate at the apex. Petals 4, ample, obliquely obovate 18 mm. long, 16 mm. broad, roundly apiculate at the apex, quite glabrous, margin under lense ciliato-serrulate. Stamens 8, very unequal, larger, anthers lineari-elongate obtuse, 1-porose, incurved, connectives base forward long 2-setosed (setæ 2-fid), backward produced to a thick ascendent spur; smaller anthers short oblong recurved, connectives base forward 2-setosed (setæ simple), backward shortly spurred. Ovary adnate to the calyx, (4-canaliculate between ovary and calyx) 4-celled, slightly produced on the top; style filiform, declinate, 2-times larger than the ovary, stigma point-shaped. Capsules oblong-globose sub-

tetragonous, base abruptly attenuate 7 mm. long, 5 mm. broad, 4-valvate. Seeds cuneiformed, laterally compressed, scarcely 2 mm. long with wings, wings subultriformed.

This is very near *B. chinensis* BENTH of Hongkong. I have examined the type of the Hongkong plant in the herbarium of Hongkong, and found that my plant is distinct from its congener. The leaves of the Formosan plant is much thinner or even membranaceous, while those of the Hongkong one are much thicker or even coriaceous.

HAB. Mushazan, Mt. Arisan, Randaizan, usually on higher elevations.

4. *Blastus* LOUR.

Blastus cochinchinensis LOUR.; MATSUM. et HAYATA Enum. Pl. Formos. p. 147.

HAB. Goshōrin, Kusshaku, Kusukusu.

DISTRIB. Western India China, Kwangtung, Hongkong, Loo-choo.

5. *Bredia* BLUME.

Key to the Formosan Species.

- (1) Plant scandent, leaves roundly ovate, obtuse at the apex, cordate at the base *B. scandens*.
 Plant erect, leaves lanceolate or elongately oblong, *B. Oldhami*.

Bredia Oldhami HOOK. f.; MATSUM. et HAYATA Enum. Pl. Formos. p. 148.

HAB. Hōzan; Bokusekikaku, Kōshūn, Kusukusu, Taiton, Wantan, Tamsui.

DISTRIB. An endemic plant.

Bredia scandens (ITÔ et MATSUM.) HAYATA Materials for a Flora of Formosa p. 114.

HAB. Hōsan, Taitō, Suiteiryō, Kusukusu.

6. *Sarcopyramis* WALL.

Sarcopyramis nepalensis WALL.; HAYATA Fl. Mont. Formos. p. 98.

DISTRIB. India and Malay.

There is a little doubt about this being identical with the Indian species. I saw several forms of this species at Kew, and noticed that there are there some specimens from continental China which are exactly the same as the present plant.

7. *Astronia* BLUME.

Astronia pulchra VIDAL, Revis. Pl. Vasc. Filip. p. 136; DC. Monogr. Phanerog. VII. p. 1097; HAYATA Mater. Fl. Formos. p. 114.

HAB. Hōzan, Kōtōshō, Kashōtō, Kōshūn, Hieranzan, Kusukusu.

DISTRIB. The Philippines.

Tashiroa okinawensis HAYATA (non MATSUM.) = *Pachycentria formosana* HAYATA.

52. Lythraceæ.

Conspectus of the Formosan Genera.

- Low or aquatic herbs with small or minute flowers; calyx membranaceous..... *Rotala*. 1
- Shrubs. Calyx herbaceous coriaceous or fleshy. Petals often large, wrinkled. (1)
- (1) Calyx-lobes herbaceous or coriaceous (2)
- Calyx-lobes fleshy; stamens ∞ *Punica* 5
- (2) Flowers 6-fid. Capsules circumscribed. *Pemphis* 2
- Flowers 4-fid. Capsules irregularly breaking up. *Lawsonia*. 3
- Flowers 6-fid. Capsules 3-6-valved. Seeds winged. *Lagerstræmia*. 4

1. *Rotala* LINN.

Key to the Formosan Species.

- (1) Plant very small, creeping 4 cm. long. Leaves very small linear less than 5 mm. *R. mexicana*.
- Plant 10-15 cm. high, erect or ascending. Leaves lanceolate, oblong or rounded, nearly 1 cm. long. (2)

DISTRIB. Africa, Asia and Australia.

Rotala rotundifolia KÆHNE; MATSUM. et HAYATA Enum. Pl. Formos. p. 150.

HAB. Taichū, Kogaishin, Taihoku, Pachina, Tamsui, Takow.

DISTRIB. Tropical and subtropical Asia and Japan.

2. *Pemphis* FORST.

Pemphis acidula FORST.; MATSUM. et HAYATA Enum. Pl. Formos. p. 151.

HAB. Fūkō, Shajō, Takow, South Cape.

DISTRIB. Sea shores of Tropical Asia, Australia, Malaya, India, Ceylon, West Africa and Polynesia.

3. *Lawsonia* LINN.

Lawsonia inermis LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 151.

HAB. Shintiku, Taihoku.

DISTRIB. Native of Northern Africa and Western Asia; generally cultivated in many other countries.

4. *Lagerstræmia* LINN.

Dichotomous Key to the Formosan Species.

Leaves 2-5 cm. long, veins 3-5 on both sides of the costa, petioles 2-3.5 mm.

long.....*L. subcostata*.

Leaves 6.5-13 cm. long, veins 7-13 on both sides of the costa. . .*L. unguiculosa*.

Lagerstræmia subcostata KÆHNE; MATSUM. et HAYATA Enum. Pl. Formos. p. 152.

HAB. Shintiku, Sansaho, Dandangai, Pachina, Biōritsu, Tamsui, Keliung, Takow, Bankinsing.

DISTRIB. Loo-choo, Southern China.

Lagerstræmia unguiculosa KÆHNE; HAYATA Mater. Fl. Formos. p. 116.

HAB. Biōritsu.

DISTRIB. An endemic plant.

5. *Punica* LINN.

Punica Granatum LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 152.

HAB. Taiman, Taihoku.

DISTRIB. Native of Persia; cultivated in Japan, China, Loo-choo and many other countries.

53. Onagrarieæ.

Conspectus of the Formosan Genera.

Seeds very many. (1)

Seeds one or two. (3)

- | | | | |
|-----|--------------------------------------------|--------------------|---|
| (1) | Seeds comose. | <i>Epilobium</i> . | 1 |
| | Seeds not comose. (2) | | |
| (2) | Stamens twice as many as calyx-lobes. | <i>Jussicea</i> . | 2 |
| | Stamens as many as calyx-lobes. | <i>Ludwigia</i> . | 3 |
| (3) | Terrestrial. Stamens 2. | <i>Circæa</i> . | 4 |
| | Aquatic. Stamens 4. | <i>Trapa</i> . | 5 |

1. *Epilobium* LINN.

Key to the Formosan Species.

- Plant 15 cm. high, leaves oblong nearly 1 cm. long, obscurely serrate, obtuse at the apex, pods linear 4 cm. long *E. alpinum*.
- Plant more than 30 cm. high, leaves oblong, slightly pubescent, pods linear 5 cm. long *E. roseum*.

Epilobium alpinum LINN.; HAYATA Fl. Mont. Formos. p. 99.

HAB. Mt. Morrison.

DISTRIB. The Himalayas and alpine regions of Europe.

Epilobium roseum SCHREB.; HAYATA Fl. Mont. Formos. p. 99.

HAB. Gansu, Morrison, Mushazan, Daironkosha.

DISTRIB. Extends from Europe eastward to Eastern Asia and Northwest America. Not yet found in Japan.

2. *Jussiaea* LINN.

Key to the Formosan Species.

Leaves oblong, obtus, glabrous. *J. repens*.

Leaves lanceolate, slightly pubescent. *J. suffruticosa*.

Jussiaea repens LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 153.

HAB. Taihoku, Ringanyō, Biōritsu, Kelung, Takow.

DISTRIB. Japan, Loo-choo, China and Malaya.

Jussiaea suffruticosa LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 154.

HAB. Pachina, Kelung, Taihoku, Kussaku, Shintengai, Tamsui, Bankinsing, South Cape.

DISTRIB. Loo-choo, Hongkong, Malaya, India, Ceylon, Tropical Africa, America, Australia and Polynesia.

3. *Ludwigia* LINN.

Key to the Formosan Species.

Capsules inflated, smooth, seeds not separately distinguishable through its walls. *L. parviflora*.

Capsules not inflated, the walls drawn tightly over the seeds so that each seed can be counted from without. *L. prostrata*.

Ludwigia parviflora ROXB.; MATSUM. et HAYATA Enum. Pl. Formos. p. 154.

HAB. Bankinsing.

DISTRIB. Through India and Malaya to Abyssinia and Persia.

Ludwigia prostrata ROXB.; MATSUM. et HAYATA Enum. Pl. Formos. p. 155.

HAB. Taihoku, Takow, Bankinsing.

DISTRIB. Tropical Africa, Mascarene island through India to Japan.

4. *Circæa* LINN.

Circæa alpina LINN.; HAYATA Fl. Mont. Formos. p. 99.

DISTRIB. Generally spread in the north temperate regions.

5. *Trapa* LINN.

Trapa natans LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 155

HAB. Taihoku, Hōzan.

DISTRIB. Europe, Asia, Africa.

54. Samydaceæ.

Homalium.

Homalium fagifolium BENTH.; MATSUM. et HAYATA Enum. Pl. Formos. p. 156.

HAB. Tōseikaku, Bankinsing.

DISTRIB. Northern China, Hongkong.

Cuscuvia sp. mentioned in "HENRY, List Pl. Formos. p. 45," is not yet known to me.

55. Passifloreæ.

Carica LINN.

Carica Papaya LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 156.

HAB. Pachina, Suisha, Shūshūgai, Taitō, Raikōkwa, Kōkō. (cultivated).

DISTRIB. Native of Tropical America.

56. Cucurbitaceæ.

Conspectus of the Formosan Genera.

Ovules horizontal or pendulous. Female flowers usually solitary, never
panicked. Leaves not divided into distinct leaflets.

.....(Cucumerinæ) 1

- Ovules pendulous. Flowers small, female in panicle or many-flowered racemes. Stamens 5, free, each with a single small straight anther.(*Zanoniceæ*. 15
- (1) Anther-cells conduplicate or sigmoid. (2)
 Anther-cells straight (or in *Bryonia* somewhat curved). 10.
- (2) Corolla divided nearly or quite to the base into 5 petals. (3)
 Corolla campanulate, divided half-way down or thereabout. (9)
- (3) Petals fimbriate at their margin *Trichosanthes*. 1
 Petals entire. (4)
- (4) Calyx-tube of the male flowers elongate; anthers usually included in the tube or nearly so. (5)
 Calyx-tube of the male flowers short; anthers usually exerted from the tube or nearly so. (6)
- (5) Seeds many, horizontal. Tendrils rarely divided *Gymnopetalum*. 2
 Tendrils divided. Fruits very large, petioles with 2-glands at the apex *Lagenaria*. 3
- (6) Stamens inserted near the mouth of the calyx-tube; anthers hardly or not at all cohering. (7)
 Stamens inserted below the mouth of the calyx-tube; anthers more or less cohering. (8)
- (7) Male flowers (partly) in racemes. Fruits opening by a stopple. *Luffa*. 4
 Flowers all solitary. Fruits very fleshy, indehiscent. *Benincasa*. 5
- (8) Male flowers (partly) racemed. Tendrils simple *Momordica*. 6
 Male flowers clustered or solitary. Tendrils simple *Cucumis*. 8
 Flowers all solitary. Tendrils 2-3-fid. *Citrullus*. 9
- (9) Tendrils divided. Flowers yellow *Cucurbita*. 10
- (10) Flowers not large, yellow, male racemes or pedicels not stout. (11)
 Flowers large, deep yellow, male racemes stout. (14)
- (11) Male and female pedicels 1-flowered, clustered. (12)
 Male flowers corymbose or subumbellate or racemed. (13)
- (12) Tendrils 2-fid. *Bryonia*. 11
 Tendrils simple. *Mukia*. 12

- (13) Fruits shortly peduncled. Connectives not produced. *Zelmeria*. 13
 Fruits on capillary peduncles. Connectives produced. *Melothria*. 14
 (14) Calyx-tube short. Seeds very many. *Thladiantha*. 7
 (15) Leaves not divided into separate leaflets. Fruits small, circumcised.
 *Actinostemma*. 16
 Leaves pedately divided into 3-5 leaflets. (16)
 (16) Fruits pea-like. Leaflets serrate. Tendrils simple. .. *Gynostemma*. 15
 Fruits elongate clavate. Leaflets entire. *Alsomitra*. 17

1. *Trichosanthes* LINN.

Key to the Formosan Species.

- (1) Bracts large very conspicuous. (2)
 Bracts small or nearly none. (3)
 (2) Bracts fimbriate. *T. laceribractea*.
 Bracts not fimbriate. *T. quinqueangulata*.
 (3) Leaves herbaceous nearly glabrous deeply lobed. *T. multiloba*.
 Leaves thinly chartaceous velvety beneath, slightly lobed.
 *T. cucumeroides*.

***Trichosanthes cucumeroides* MAXIM. ; MATSUM. et HAYATA Enum. Pl. Formos. p. 157 ; HAYATA, Mater. Fl. Formos. p. 117.** Twining, stem striate, pubescent, hairs strigose, patent, internodes 7 cm. long, tendril simple. Leaves alternate, petiolate, oblong-cordate, 9 cm. long, 6 cm. broad, acute or acuminate, at the apex, base profoundly cordate, margin remotely obscurely serrate, serras mucronate, 5-nerved, lateral nerves reflexed, secondary veins reaching the apex of serras, hispid and scabrous above, villosely pubescent beneath, hispid at the nerves, petioles 2 cm. long. Fl. ♂: racemose, racemes axillary 10 cm. long, bracts minute; flowers funnel-shaped 8 cm. long. Calyx long tubuliformed, campanulate at the apex, tubes 7 cm. long, 5-dentate, teeth minute lanceolate, 3 mm. long, corolla 5-parted, 1 cm. long.

HAB. Kōshūn, Takow, Hikaku.

DISTRIB. Japan, Hongkong.

***Trichosanthes laceribractea* HAYATA** Materials for a Flora of Formosa p.

117. Scandent subglabrous, stem striate, sulcate, internodes 12 cm. long, tendrils opposite the leaves, 2-fid. Leaves alternate, petiolate, broadly cordate, 15 cm. long as broad, acute at the apex, base profoundly broadly cordate, slightly 3-5-lobate, (terminal lobe triangular, 6 cm. long as broad) margin obscurely remotely mucronately serrate, 5 nerved, 3-central nerves erect, 2-basal ones reflexed, all nerves reaching the apex of lobes, above nigricant albopunctate mostly scabrous, beneath shortly hispid, petioles 4 cm. long. Racemes axillary, flowering towards the apex, flowers bracteate, bracts large embracing flower-buds, broadly ovate acute, margin lacerate or fimbriate multinerved 3 cm. long as broad. Flowers ♂: shortly pedicellate, calyx tubuliformed campanulate towards the apex, tubes 3 cm. long 1 cm. in diameter at the apex, blade 5-lobate, lobes lacerate 13 mm. long 5 mm. broad. Corolla not perfectly known.

HAB. Taitō: Hinan.

Very near, or perhaps quite identical with, a Chinese specimen at Kew which is named as *Trichosanthes palmata* ROXB. The type of the same species is quite different from the Chinese specimen and also from the present plant. The bracts of the type are usually entire or but a little fimbriate in the upper ones, while those of my plant are very deeply fimbriate.

Trichosanthes multiloba MIQ.; MATSUM. et HAYATA Enum. Pl. Formos. p. 157.

HAB. Hikaku, Takow.

DISTRIB. Borneo, Japan and Central China.

Trichosanthes quinquangulata GRAY; HAYATA Mater. Fl. Formos. p. 118.

HAB. Kōtōshō.

DISTRIB. Mangsi island, the Philippines.

OBSERV. A strong twining herb, nearly glabrous, internodes 12 cm. long, tendrils 4-divided at the apex; leaves broadly cordate 10 cm. long as broad, cordate at the base, acute at the apex, margin 5-angled, acuminate at the tip of the angles, very minutely, obscurely and remotely serrate, or nearly entire; racemes of male flowers, 20 cm. long, bearing flowers nearly at

the apex of the axis, bracts conspicuous, very large nearly entire, 3 cm. long, embracing flower-buds.

2. *Gymnopetalum* ARX.

Gymnopetalum cochinchinense KURZ; MATSUM. et HAYATA Enum. Pl. Formos. p. 158.

HAB. Takow, Daiyenrin.

DISTRIB. India and Malaya.

3. *Lagenaria* SER.

Lagenaria vulgaris SER.; MATSUM. et HAYATA Enum. Pl. Formos. p. 158.

HAB. Taihoku. (cultivated).

DISTRIB. Generally cultivated in tropical and subtropical regions of the World.

4. *Luffa* LINN.

Luffa cylindrica REM.; HAYATA Mater. Fl. Formos. p. 120.

HAB. Kego, Hosan.

DISTRIB. Cultivated throughout the tropics.

5. *Benincasa* SAVI.

Benincasa cerifera SAVI; MATSUM. et HAYATA Enum. Pl. Formos. p. 165.

HAB. Taitōchō: Karenkō. (cultivated).

DISTRIB. Cultivated in China, Japan, India and Africa.

6. *Momordica* LINN.

Momordica cochinchinensis SPRENG.; MATSUM. et HAYATA Enum. Pl. Formos. p. 159.

HAB. Bokushishō, South Cape.

DISTRIB. India, Malaya and Philippines.

7. *Thladiantha* BUNGE.*Key to the Formosan Species.*

- (1) Leaves ovate deeply cordate, scabrously dotted with white points, remotely mucronately serrulate on the margin. *T. punctata*.
 Leaves more or less lobate or obscurely grossly dentate. (2)
- (2) Leaves softly tomentose, obscurely dentate or simply mucronately remotely serrate. *T. formosana*.
 Leaves beset with scabrous hairs, lobate. *T. taiwaniana*.

Thladiantha formosana HAYATA Fl. Mont. Formos. p. 100. Herb, scandent and voluble, branchlets very slender sulcate, long hairy, tendrils 2-parted. Leaves long petioled, petioles as long as blades, or shorter, pilose, blades thick, membranaceous, angular, roundly cordate or ovately cordate 10 cm. long 7 cm. broad, acute acuminate, margin minutely remotely denticulate, scabrid above, villosely pubescent beneath. Male flowers puberulous, racemose, racemes long 2-3-times longer than petioles, bracts small, deciduous. Calyx-tube short broadly campanulate, lobes ovately lanceolate 5 mm. long. Petals patent ovately lanceolate 11 mm. long. Stamens 5, equal, anthers 1-celled straight, filaments free. Rudiment of ovary globose. Appendices a short petaloid obtuse.

HAB. Tosan, Morrison.

Very much resembles *T. nudiflora* HEMS., but differs from it in having peduncled racemes and smaller flowers which are as half as those of the allied species.

DISTRIB. An allied species *T. nudiflora* HEMS. occurs in Central China.

Thladiantha punctata HAYATA Materials for a Flora of Formosa p. 119, and Ic. Pl. Formos. Fasc. I. Pl. XXXVII. Scandent, stems glabrous, striate, internodes 8 cm. long. Leaves alternate petiolate, oblongo-cordate or ovate, 12 cm. long, 7½ cm. broad, cordately reniformed at the base, 2½ cm. long below the base, the basal sinus ovate acute, margin remotely mucronately serrate, albo-punctate above, very scabrous, but hispid on the costa beneath, otherwise glabrous, trinerved, lateral nerves

divaricate from the central nerve at an angle 90° , abruptly reflexed with 4-5-secondary veins, central nerve straight with 3-4 secondary veins on each side, anastomosing near the margin, veinlets reticulate, tendrils solitary opposite to the leaves, simple, petioles 4 cm. long. Flowers dioecious; fl. ♂: solitary opposite to the leaves, long pedunculate, peduncles 4 cm. long. Calyx campanulate, 5-dentate, tube 3 mm. long, 8 mm. in diameter, teeth lanceolate 5 mm. long, 1 mm. broad; corolla 5-parted, segments broadly lanceolate 17 mm. long 5 mm. broad. Stamens 5, 4 mm. long; rudiment of ovary convex. Bracts 0.

HAB. Shintiku: Goshizan.

Thladiantha taiwaniana HAYATA Materials for a Flora of Formosa p. 119. Scandent, stem striate, subglabrous, internodes 7 cm. long, tendrils opposite the leaves, simple. Leaves alternate, petiolate, oblong-cordate in outline, 10 cm. long 8 cm. broad, acute at the apex, profoundly cordate at the base, irregularly dentate, or obscurely or slightly tri-lobed, terminal lobe oblong 6 cm. long $3\frac{1}{2}$ cm. broad, obscurely and remotely mucronately repandate, lateral lobes irregularly dentate, teeth round or mucronate at the apex, strigosely punctate above, very much scabrous on the costa, beneath slightly hispid on the nerves, otherwise subglabrous, trinerved, central nerve straight with 5-secondary veins on each side, lateral nerves divaricate from the central one at an angle 60° , suddenly reflexed, secondary veins 6 on each side, reaching the apex of the teeth, petioles 3 cm. long. Racemes ♂ axillary solitary 6-7 cm. long, floriferous at the apex, bracts broadly obovate embracing flower buds, 7 mm. long 5 mm. broad, pubescent. Calyx-tube concave 4 mm. broad, pubescent, lobes 5, triangularly ovate, 4 mm. long $2\frac{1}{2}$ mm. broad, acuminate. Petals 5, oblong, obtuse at the apex, truncate at the base, nervose. Stamens 5, filaments distinct.

HAB. Kishito.

Very neary *T. calcarata* DC., but differs from it by the broad lobes of the calyx. *T. calcarata* has linear narrower lobes.

8. *Cucumis* LINN.*Key to the Formosan Species.*

Fruits ellipsoid or obovoid round or obscurely trigonous. *C. trigonus*.

Fruits spherical ovoid elongate or contorted, not spinous nor tuberculate.

. *C. Melo*.

Fruits sometimes tuberculated commonly elongate cylindric. *C. sativus*.

Cucumis trigonus ROXB.; MATSUM. et HAYATA Enum. Pl. Formos. p. 159.

HAB. Takow.

DISTRIB. From Persia to Malaya.

Cucumis Melo LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 159.

HAB. Widely cultivated.

DISTRIB. Perhaps a native of tropical Asia.

Cucumis sativus LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 159.

HAB. Widely cultivated.

DISTRIB. Perhaps a native of Northern India; generally cultivated in Japan and China.

9. *Citrullus* SCHRAD.

Citrullus vulgaris SCHRAD.; MATSUM. et HAYATA Enum. Pl. Formos. p. 161.

HAB. Cultivated everywhere in the island.

DISTRIB. Widely cultivated in the warm countries.

10. *Cucurbita* LINN.

Cucurbita maxima DUCH.; MATSUM. et HAYATA Enum. Pl. Formos. p. 161.

HAB. cultivated.

DISTRIB.

11. *Bryonopsis* ARN.

Bryonopsis laciniosa NAUD. ; MATSUM. et HAYATA Enum. Pl. Formos. p. 162.

HAB. Taihoku, Maruyama, Kelung, South Cape.

DISTRIB. Malay, India, Ceylon, tropical Africa and Australia.

12. *Mukia* ARN.

Key to the Formosan Species.

Leaves roundly cordate in outline, more or less lobulate or lobate, smaller,
2 cm. in diameter. *M. scabrella*.

Leaves more or less angular nearly 8-lobed, much larger, 5 cm. in diameter.
..... *M. leiosperma*.

Mukia leiosperma THWAIT. ; MATSUM. et HAYATA Enum. Pl. Formos. p. 163.

HAB. Shintiku.

DISTRIB. Eastern India.

Mukia scabrella ARN. ; MATSUM. et HAYATA Enum. Pl. Formos. p. 163.

HAB. Tamsui, Shintiku, Tōhoshu, Kaslinro, Kavenkō, Takow.

DISTRIB. Tropical Asia, Africa and Australia.

13. *Zehneria* ENDL.

Key to the Formosan Species.

Leaves herbaceous greenish even when dried, very thin triangularly cordate,
more or less angular. *Z. mysorensis*.

Leaves chartaceous hastately 3-lobed, lobes divaricate. *Z. umbellata*.

Zehneria mysorensis ARN. ; MATSUM. et HAYATA Enum. Pl. Formos. p. 161.

HAB. Kelung, Maruyama, Bōkō, Tikushiko, Tamsui.

DISTRIB. Loo-choo, Hongkong, China, Australia, Malay and India.

Zehneria umbellata THWAIT. ; MATSUM. et HAYATA Enum. Pl. Formos. p. 161.

HAB. Suibi, Pachina, Shintiku, Taihoku, : Byōkosha, Tamsui, Takow.

DISTRIB. Throughout India and Malaya to North Australia.

14. *Melothria* LINN.

Key to the Formosan Species.

- (1) Leaves triangular-cordate obtusely dentate, slightly lobed. *M. formosana*.
 Leaves more or less cordate entire or somewhat 3-lobed. *M. odorata*.

Melothria formosana HAYATA Materials for a Flora of Formosa, p. 120. Glabrous, scandent, striate, tendrils simple, papilliferous at the apex. Leaves alternate, petiolate, sagittately cordate, or triangularly cordate, $2\frac{1}{2}$ cm. long as broad, sagittately cordate at the base, acute at the apex, obtuse at the extremity, margin irregularly dentate, teeth obtusely mucronate or lobulate, very scabrous and punctate above, hispid on the nerves beneath, 5-nerved, herbaceo-membranaceous, somewhat thick at the margin, petioles scabrous 1 cm. long. Racemes 2-3-flowered, axillary, pedicels 3 cm. long. Flowers dioecious? fl. ♀: 11 mm. long, calyx campanulate 3 mm. in diameter, shortly 5-toothed, teeth 1 mm. long. Corolla 5-parted, segments ovate, obtuse, 3 mm. long, $2\frac{1}{2}$ mm. broad, patent, yellowish. Ovary oblong, 4 mm. long 3 mm. in diameter, rostrate at the apex, beak $1\frac{1}{2}$ mm. long, style 3 mm. long, inserted on a annular disc, stigma 3, capitate, 2-lobed. Male flowers not yet known. Berry globose, 1 cm. in diameter, many-seeded, stipes very slender thread-like, 2-3 cm. long. Seeds ovate, complanate albescent 4 mm. long, glabrous.

HAB. Banchmyō, Rokkirisha.

Melothria odorata HOOK. f. et THOMS.; MATSUM. et HAYATA Enum. Pl. Formos. p. 164.

HAB. Bankinsing.

DISTRIB. India, Malay, the Philippines.

15. *Gynostemma* BLUME.

Gynostemma pedatum BLUME; HAYATA Fl. Mont. Formos. p. 100.

HAB. Arisan.

DISTRIB. India, Malay archipelago, central and eastern China, Japan and the Loo-choo islands.

16. *Actinostemma* GRIFF.

Key to the Formosan Species.

Racemes shorter, leaves 5-lobed. *A. lobatum*.
 Racemes very much longer, leaves not lobed or, if any, very slightly at the
 base. *A. racemosum*.

Actinostemma lobatum MAXIM.; MATSUM. et HAYATA Enum. Pl. Formos. p. 165.

HAB. Taihoku, Bankinsing.

DISTRIB. From Mandshuria to Japan and China.

Actinostemma racemosum MAXIM.; MATSUM. et HAYATA Enum. Pl. Formos. p. 165.

HAB. Taihoku.

DISTRIB. Japan and China.

17. *Alsomitra* ROEM.

Alsomitra integrifoliola HAYATA Mater. Fl. Formos. p. 121; and Ic. Pl. Formos. Fasc. I. Pl. XXXVIII and XXXIX. A twining herb, branches very slender, distinctly furrowed, more or less complanate, nearly glabrous. Leaves alternate, 7 cm. distant, pedately 5-foliate, common petioles 3 cm. long, ternately branched, terminal one bearing a terminal leaflet, lateral ones furcately branched, each branches bearing lateral leaflets, terminal leaflets a little larger than the lateral ones, oblong, or elongately oblong, 8 cm. long 3 cm. broad, acuminate at the apex, shortly aristate on the summit, shortly attenuate at the base, 2-glanduliferous at the base, glands black orbicular, margin nearly entire or slightly undulate slightly carved, crassomembranaceous, nerves and veins prominent on both surfaces, lateral leaflets smaller, basal ones smallest, unequal at the base, more or less obliquely falcate towards the apex; tendrils opposite the leaves, more than 10 cm. long, 2-fid at the apex. Flowers dicecious in long panicles axillary or terminal,

panicles 40 cm. long 15 cm. broad, pyramidal, very slender, loosely flowered, loosely branched, basal branches 15 cm. long, bracts at the base of the branches, pedately 3-foliolate, with additions of two small basal segments, 1 cm. long including stalks. Fl. ♂: patent, 6-7 mm. in diameter, pedicels slender, 2 mm.-5 mm. long. Calyx flattened, 4 mm. in diameter, 5-lobed, lobes elongately oblong broadest at the base, obtuse at the apex. Petals 5 distinct, obovate, 3 mm. long, $2\frac{1}{2}$ mm. broad, round, shortly apiculate at the apex, cuneate at the base, hirsute towards the margin, horizontally patent. Stamens 5, distinct, clustered on the centre of the flowers, divaricate each other, incurved downwards at the apex, filaments $\frac{3}{4}$ mm. long, anthers 1-celled, with a red round gland on the back. Rudimental ovary 0. Fruiting panicles pendulous, 40 cm. long, 20 cm. wide, profusely fructiferous, pedicels 1-1 $\frac{1}{2}$ cm. long. Pods cylindrical, 5 cm. long, 12 mm. in diameter in section, obtuse at the base, quite truncate at the apex, opening by a terminal round triangular mouth furnished with three valves, each turning inside, walls light brown glabrous, rough or elevately punctate towards the base, or slightly muricate, with a line around the mouth; valves very broad, broadly triangular 1 cm. broad at the base, 5 mm. long. Seeds pentagonal in outline, stalked, flattened, 8 mm. long including stalks, 7 mm. broad, margin 2-lamellate, bluntly-toothed, teeth 5, $2\frac{1}{2}$ mm. broad $1\frac{1}{2}$ mm. long, stalks 3 mm. long, 2-mm. broad; wings inserted between lamellas, very thin membranaceous, semi-transparent, oblong-linear, 2 cm. long, 5-6 mm. broad. Embryo triangular-ovate, 5 mm. long, $2\frac{1}{2}$ mm. broad, radicle very short 1 mm. long; cotyledons broadest at the base, truncate or emarginate at the apex.

Alsomitra clavigera HENRY List Pl. Formos. p. 46; MATSUM. et HAYATA Enum. Pl. Formos. p. 164, (non HOOK. f.).

Gynostemma integrifolia COGNIAUX in DC. Monogr. Phanerog. III. p. 916.

The present plant is mentioned in HENRY'S List of Plants from Formosa p. 46, as *Alsomitra clavigera* HOOK. f. and is also referred to the same species by myself in "Enum. Pl. Formos. p. 164," as the description of HOOKER'S plant is, in greater part, in accordance with my plant. Mr. E. D. MERRILL

of the Bureau of Science, P. I., when we were together looking over the Formosan collections in the Herbarium at Tōkyō, told me that he thought the plant to be identical with *Gynostemma integrifoliola* COGX. To what species the present plant should be definitely referred was a very difficult question for me, until I saw the types of HOOKER's and COGNIAUX's species and HENRY's specimen, all preserved in the Kew Herbarium. A comparison of my plant with the specimens above mentioned showed me clearly that it is exactly the same as the specimen in HENRY's collection, (which lacks flowers), but quite different from HOOKER's plant. I also found that my flowering specimen accords very well with *Gynostemma integrifoliola* COGX., the specimen of which lacks fruit. In the original description of COGNIAUX, there is mentioned "fructus fuscus glaber vel leviter puberulus, 7-8 mill., crassus." The description must, I infer, have drawn up from a premature fruit, as there is given no account about seeds. The fruits of this species are, as is seen in my specimen, as long as 4 cm. and have numerous winged seeds. The *Gynostemma* of COGNIAUX, as far as my collections with flowers and fruits are concerned, does not accord with the general characters of *Gynostemma*, but quite agrees with those of *Alsomitra*. My plant and also COGNIAUX's plant, therefore, should be referred to the latter genus. Accordingly, the new combination, *A. integrifoliola* HAYATA is much to be desired for the present plant. It comes very near to *A. clavigera* HOOK. f., but differs from it in having much smaller pods which are only half the size of those of the latter plant, and also in having much smaller seeds with thin wings, which seeds are bluntly and obscurely indented on the margin. The seeds of HOOKER's plant are much larger, and acutely and grossly indented.*

* Owing to a negligence when reading proofs, three lines in my "Materials" p. 122, line 9-7 from bottom, are misprinted. They should be corrected as "also in having much smaller seeds with thin wings, which seeds are bluntly and obscurely indented on the margin. The seeds of HOOKER's plant are acutely, clearly and grossly indented."

57. Begoniaceæ.

Begonia LINN.*Key to the Formosan Species.*

- (1) Leaves quite glabrous. (2)
 Leaves more or less hairy. (4)
- (2) Leaves broadly rounded.....*B. kotaensis*.
 Leaves oblong or lanceolate. (3)
- (3) Fruits winged on one side.....*B. taiwaniana*.
 Fruits entirely wingless.*B. aptera*.
- (4) Leaves ferrugineo-hirsute.*B. ferruginea*.
 Leaves not ferrugineo-hairy, but very slightly beset with minute
 hairs. (5)
- (5) Leaves palmately lobate.*B. sinensis*.
 Leaves slightly lobate or not lobate.....*B. luciniata* var. *formosana*.

Begonia aptera HAYATA Materials for a Flora of Formosa p. 122. Stem strong, 40-50 cm. high, branched, glabrous, branches divaricate. Leaves long petiolate oblique oblong 14 cm. long 6 cm. broad, obtuse at the apex, base very oblique, acute or truncate on the upper side, cordate or auriculate on the lower side, auricles 2 cm. long as broad, remotely minutely mucronately serrate, serras 12 mm. distant, 6-7-nerved, glabrous on both sides, shining above, dull beneath, petioles 4 cm. long, stipules lanceolate 7 mm. long. Fruits capsular depresso-globose, 12 mm. long, 14 mm. broad, depressed at the apex, 3-celled, wings obscure or 0.

HAB. Randaizan, Shintiku, Goshizan.

Near *B. Wageriana* Hook. f. Bot. Mag. t. 4988, from which the present plant differs in having very small wings of the fruits; it resembles *B. microptera* Bot. Mag. t. 4974, in respect of small wings of capsules, but differs from that in having entire sepals and obscurely and remotely serrate leaves. Also near *B. Roxburgii* A. DC. and *B. inflata* C. B. CLARKE, but differs from the both in having not horned, but quite rounded, fruits.

Begonia ferruginea HAYATA Materials for a Flora of Formosa p. 123. Ferrugineous, branched, ferrugineo-rubescens when dried, at first lanate, at last early glabrous, 30 cm. high. Leaves petiolate, stipulate, obliquely cordate, 15 cm. long, 23 cm. broad, very oblique at the base, many-lobed, or irregularly dentate-lobulate, lobules serrulate, acute, ferrugineo-hispid above, ferrugineo-tomentose beneath, at last glabrous on both surfaces, 7-9-nerved, petioles 8 cm. long, stipules ovate, 1-2 cm. long, 7 mm. broad. Cymes axillary few-flowered, bracteate, bracts stipule-like. Male flowers: segments of the perianth 4, 2-exterior ones larger, broadly ovate 2 cm. long 18 mm. broad, rounded at the apex, cordate at the base, 2-inner ones obovate, $1\frac{1}{2}$ cm. long, 8 mm. broad, rounded at the apex, obtuse at the base. Stamens ∞ , 4 mm. long, filaments distinct 3 mm. long, anthers oblong 1 mm. long, connectives slightly produced.

HAB. Randaizan, Tappansha.

Near *B. Bourdingiana* CHAMP.; but differs in having elongate stipules and in the connectives of the anthers, which are obtusely acute, but not truncate, as is the case with the other species.

Begonia kotoensis HAYATA Materials for a Flora of Formosa p. 124. Rhizome repent, leafy, radicans. Leaves long petiolate, stipulate, orbicular, 8 cm. in diameter, oblique horizontally patent, oblique at the apex, abruptly acute, obtuse at the extremity, profoundly cordate at the base, imbricate on the lower margin, margin crenate, crenas shortly mucronate, glabrous, palmately 10-nerved, herbaceous, petioles incrassate, 10-20 cm. long, stipules triangularly ovate, 8 mm. long, acute, base 7 mm. broad. Scapes at the apex of the rhizome, incrassate, 20 cm. long, 3-flowered, flowers pedicellate, pedicels $1\frac{1}{2}$ cm. long. Flowers ♂: segments of the perianth 4; 2 outer ones larger orbicular $1\frac{1}{2}$ cm. long as broad, rounded at both ends; 2 inner ones smaller, obovate, 1 cm. long 5 mm. broad, rounded at the apex. Stamens ∞ , $2\frac{1}{2}$ mm. long, filaments free, $1\frac{1}{2}$ mm. long; anthers oblong, obtuse at the apex.

HAB. Kōtōshō.

Near *Begonia Bretschneideriana* HEMSLE., but differs from it in many points.

Begonia laciniata ROXB. var. **formosana** HAYATA Materials for a

Flora of Formosa p. 124. Rhizome repent, stems strong, striate, 30–40 cm. long, glabrous, few-flowered. Leaves long petiolate, glabrous oblique ovate 15 cm. long 7 cm. broad, base cordate, very oblique, acuminate at the apex, irregularly dentate or duplicate dentate, palmately 9–11-nerved, somewhat thick, petioles 10 cm. long, stipules triangular-ovate 6 mm. long. Cymes few-flowered. Fl. ♂: segments 4, 2 outer ones larger, broadly orbicular 2 cm. in diameter, 2 inner ones smaller obovate, rounded at the apex, $1\frac{1}{2}$ cm. long 1 cm. broad. Stamen ∞ , 4 mm. long, filaments free, 2 mm. long, anthers $1\frac{1}{2}$ mm. long, connectives slightly produced rounded at the apex. Fruits capsular, 23 mm. long, unequally trigonous, unequally three-winged, wings two, frontal one narrowed, 4 mm. broad 23 mm. long, back one broader, 20 mm. broad 17 mm. long. Seeds minute.

Begonia laciniata HAYATA in MATSUM. et HAYATA Enum. Pl. Formos. p. 166 (non ROXB.).

HAB. Giran, Heirimbi, Urai, Raga, Bokusekikaku, Shichiseitonzan, Hokuto.

The present *Begonia* is the commonest one in Formosa. It differs from *B. laciniata* ROXB. var. *Bowringiana* in having quite glabrous leaves. The variety *Bowringiana* is always tomentose or pubescent. The Formosan plant should, therefore, be another variety of *B. laciniata* ROXB. to which Mr. W. B. HEMSLEY also refers in Ind. Fl. Sin. I. p. 322. It bears some resemblance to *B. sinensis*, but differs from that in having larger flowers and glabrous leaves.

Begonia sinensis A. DC.; MATSUM. et HAYATA Enum. Pl. Formos. p. 166.

HAB. Kōshūn, Tamsui.

DISTRIB. China: Chili, Kiangsi, Hupei.

Begonia taiwaniana HAYATA Materials for a Flora of Formosa p. 125. Stem glabrous, strong, branched. Leaves petiolate, stipulate, glabrous, lanceolate, 13 cm. long $3\frac{1}{2}$ cm. broad, base cordate or rounded, irregularly serrulate, dentate on the lower side, 5–7-nerved, petioles 4 cm. long, stipules subulate 3 mm. long. Cymes axillary few-flowered, bracts ovate, acuminate, 5 mm. long.

Fl. ♂: segments of perianth 4, 2-outer ones larger, broadly obovate 6 mm. long. Stamens ∞ , filaments distinct, connectives truncate. Fruits capsular 13 mm. long, trigonous, unequally 3-winged, wings two frontal ones narrowed 2 mm. broad, one back one broad, 10 mm. broad 13 mm. long, septicidally dehiscing.

HAB. Tappansha; Mt. Morrison.

Near *B. microptera* Bot. Mag. t. 4974, from which the present plant differs in having one sided prominent wing.

58. Ficoideæ.

Conspectus of the Formosan Genera.

- (1) Calyx-tube adnate to the ovary.....*Tetragonia*. 1
 Calyx-tube not adnate to the ovary. (2)
 (2) Calyx-tube elongate. Stamens intorted on the calyx-tube...*Sesuvium*. 2
 Calyx deeply 5-partite. Stamens hypogynous.*Mollugo*. 3

1. *Tetragonia* LINN.

Tetragonia expansa MURR.; MATSUM. et HAYATA Enum. Pl. Formos. p. 167.

HAB. Pescadores.

DISTRIB. From China and Corea through Japan and Australia, to New Zealand and Southern America.

2. *Sesuvium* LINN.

Sesuvium Portulacastrum LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 167.

HAB. Takow, Pescadores.

DISTRIB. In tropical and subtropical regions of the World.

3. *Mulugo* LINN.*Key to the Formosan Species.*

- (1) Leaves linear lanceolate quite glabrous. *M. stricta*.
 Leaves obovate glabrous or hairy. (2)
- (2) Leaves covered with cotton wools. *M. hirta*.
 Leaves glabrous or slightly hairy. *M. Spergula*.

Mollugo hirsuta THUNB.; MATSUM. et HAYATA Enum. Pl. Formos. p. 168.

HAB. Bōryōgai, Takow.

DISTRIB. Widely spread in warm countries.

Mollugo Spergula LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 168.

HAB. Shōkwa, Bankinsing.

DISTRIB. Asia and Tropical Africa and Australia.

Mollugo stricta LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 168.

HAB. Taihoku, Kelung, Kōtōshō, Taichokuzan, Kussliaku.

DISTRIB. Japan, Loo-choo, Hongkong, China, India, Ceylon, Malay, Polynesia.

59. Umbelliferæ.

Conspectus of the Formosan Genera.

- Umbels simple or irregularly compound. Vittæ 0. Heterosciadiæ. (1)
- Umbels compound. Secondary ridges of fruits inconspicuous. Haplozygiæ. (2)
- Umbels compound. Secondary ridges of fruits prominent. Diplozygiæ. (9)
- (1) Leaves simple stipulate. Fruits laterally compressed.
 *Hydrocotyle*. 1

- Leaves compound, not stipulate. Umbels subcorymbose... *Sanicula*. 2
- (2) Fruits laterally compressed, or at least constricted at the commissure, not or very obscurely winged. (Ammineæ). (3)
- Fruits widest at the commissure, in horizontal section circular or somewhat dorsally compressed. (Seselineæ). (5)
- Fruits much dorsally compressed, dorsal ridges slightly excurrent, lateral ones winged, wings of the opposite carpels closely applied face to face. (Peucedaneæ). (8)
- (3) Carpels in outline ovate or oblong, not distinctly narrowed upwards, plane on the inner face; seeds plane or concave on the inner face. (4)
- Carpels in outline elongate oblong; seeds in horizontal section nearly circular, grooved on the inner face. (3*)
- (3*) Umbels compound. *Osmorrhiza*. 6
- Umbels simple. *Oreomyrrhis*. 7
- (4) Leaves simple and entire. Flowers yellow or lurid.... *Bupleurum*. 3
- Leaves pinnate or decomposed. (4*)
- (4*) Umbels short-peduncled, leaf-opposed, exbracteolate.... *Apium*. 4
- Umbels not leaf-opposed. Ridges of fruits slender, valleys 2-3-vittate. *Pimpinella*. 5
- (5) Fruits in section nearly terete. Primary ridges of fruits more or less distinct, not alate, (slightly winged in *Feniculum*). (6)
- Fruits in section dorsally compressed. Primary ridges of fruits (or lateral ones only) more or less excurrent, winged. (7)
- (6) Primary ridges thick, dorsal and lateral ones nearly equal, not corky. *Feniculum*. 8
- Primary ridges prominent, more or less corky. (6*)
- (6*) Primary ridges more or less winged, lateral ones distinct. *Phellopterus*. 9
- Primary and lateral ridges thickened and broadened, but not winged, dorsal and intermediate ones equally prominent.... *Oenanthe*. 10
- (7) Ridges all expanded in thick wings, wings nearly equal or lateral ones broader. (7*)

- Ridges dorsal and intermediate ones prominent, but not winged, lateral ones distinctly expanded in wings, carpels subentiformed. *Angelica*. 13
- (7*) Carpels dorsally compressed; vitta ∞ , sometimes obscure. *Ligusticum*. 11
- Carpels semiterete; vitta solitary on vallecule. *Onidium*. 12
- (8) Flowers not radiant. Ovary glabrous. *Peucedanum*. 14
- (9) Fruits glabrous. *Coriandrum*. 15
- Fruits hirsuto-setose. *Torilis*. 16

1. *Hydrocotyle* LINN.

Key to the Formosan Species.

- (1) Umbels sessile. *H. conferta*.
Umbels more or less pedunculate. (2)
- (2) Leaves beset with very rough stiff hairs. Umbels solitary. *H. setulosa*.
Leaves glabrous or slightly beset with soft hairs. (3)
- (3) Leaves glabrous much larger, peduncles of umbels very much shorter than petioles. (4)
Leaves slightly hairy, peduncles of umbels longer than, or as long as petioles. *H. rotundifolia*.
- (4) Leaves not lobed shallowly dentate, teeth broad and acute... *H. asiatica*.
Leaves slightly lobed, shallowly crenulate. *H. javanica*.

***Hydrocotyle asiatica* LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 169.**

HAB. Kelung, Sharyōtō, Kōshūn, Ryngaryō, Maruyama, Tamsui, Pescadores, Takow.

DISTRIB. Widely diffused in tropical and subtropical regions of the World.

***Hydrocotyle conferta* WIGHT; MATSUM. et HAYATA Enum. Pl. Formos. p. 170.**

HAB. Niki, Suichōryū, Maruyama, Kussaku.

DISTRIB. Eastern India.

Hydrocotyle javanica THUNB. ; MATSUM. et HAYATA Enum. Pl. Formos. p. 170.

HAB. Kelung, Bankinsing.

DISTRIB. Southern China, Eastern India, Malay, Philippines, Australia, New Zealand, Africa.

Hydrocotyle rotundifolia ROXB. ; MATSUM. et HAYATA Enum. Pl. Formos. p. 171.

HAB. Taihoku, Kelung, Hinan, Biōritsu, Maruyama, Tamsui, Takow.

DISTRIB. Southern China, Himalaya, Ceylon, Malaya, Australia, Africa.

Hydrocotyle setulosa HAYATA Fl. Mont. Formos. p. 102. Herb, perennial, prostrate, radicant at nodes, branches in innovation erect pilose. Leaves long petiolate, petioles nearly 2 cm. long, slightly pilose or pubescent, hairs descendent, blades reniformly cordate, 10 mm. long 13 mm. broad, 7-lobed, lobes obtuse broadly rounded, rarely contiguous slightly marginate crenate, crenas acute, above setulose, beneath piloso-setose, setæ somewhat long; stipules broadly rounded entire or bi-lobed, membranaceous. Peduncles 2-3 cm. long, piloso-pubescent, hairs descendent. Umbels simple, many-flowered, flowers shortly pedicelled, pedicels 1 mm. long, densely capitate. Fruits broadly cordate orbicular, compressed, costate on both sides, 1 mm. long, 1½ mm. broad.

HAB. Arizan.

Somewhat resembles *H. Wilfordi* MAXIM., but differs from it in the fruits and setulose leaves.

2. *Sanicula* LINN.

Key to the Formosan Species.

- (1) Leaves 3-foliolate. *S. satsumana*.
 Leaves 5-foliolate. *S. petagnioides*.

Sanicula petagnioides HAYATA Fl. Mont. Formos. p. 103. Perennial herb, small, quite glabrous. Stems erect nearly 12 cm. high few-branched. Radical leaves long petiolate, petioles slender 6 cm. (rarely 12 cm.) long glabrous, base dilate, blades broadly pentagonous in outline, 2-2½ cm. in diameter, 5-parted, segments 2-3-lobed rhomboid base cuneate aristately serrate albo-

lamelligerous, shortly petiolulate. Cauline leaves sessile nearly like radical ones 3-5-parted, segments cuneato-lanceolate. Umbels composite 2-3 at the apex of the stem, or axillary solitary, long pedunculate, (peduncles 3 cm. long), 5-7-radiate 6 mm. long 10 mm. in diameter, bracts a few setaceo-dentiformed minute. Umbellules smaller $2\frac{1}{2}$ mm. long 3 mm. in diameter, base bracteolate, bracteoles 5-6 minute, setaceo-dentiformed, 5-6-flowered, flowers exterior male, long pedicelled, central one perfect fertile. Flowers ♂: very minute nearly $\frac{2}{3}$ mm. in diameter long pedicellate, pedicels $1\frac{1}{2}$ mm. long; calyx-lobes prominent setaceo-dentiformed, petals white, ovate, obtuse, or acute at the apex, inflexed; stamens 5, filaments 2-times longer than petals; rudiments of ovary convex. Flowers ♀ sessile minute, 3-times larger than male flowers, 2 mm. long; calyx-tube ellipsoid, echinate, lobes suberect prominent setaceous; petals and stamens the same as in the male; styles suberect slightly recurved. Fruits obovately orbicular $1\frac{2}{3}$ mm. broad.

The present plant comes very near *S. satsumana* MAXIM., but differs from it in having 5-parted leaves, less spined fruits, smaller flowers, and in the presence of cauline leaves. It differs also in the structure of fruits. Also near *S. orthacantha* S. MOORE, but differs from it in having much smaller flowers and stalked lobes of leaves.

***Sanicula satsumana* MAXIM. ; MATSUM. et HAYATA Enum. Pl. Formos. p. 175.**

HAB. Chikushiko, Waitan.

DISTRIB. Southern Japan, Loo-choo.

3. *Bupleurum* LINN.

***Bupleurum falcatum* LINN. : HAYATA Mater. Fl. Formos. p. 126.**

HAB. Biyōritsu.

DISTRIB. South of Europe, Asia Minor to China and Japan.

4. *Apium* LINN.

Key to the Formosan Species.

Leaflets deeply lobed. *A. graveolens*.
 Leaflets entire not lobed. *A. integrilobum*.

Apium graveolens LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 171.

HAB. Cultivated in Taihoku and other places.

Apium integrilobum HAYATA Materials for a Flora of Formosa p. 126. Herb glabrous, 70 cm. high, branched. Cauline leaves tri-parted, segments lanceolate 25 mm. long, cuneate at the base, petioles 1 cm. long. Umbels leaf-opposed sessile, 6-7-radiate, 3 cm. long as broad. Umbellules 5 mm. long as in diameter 15-20-flowered. Flowers white, pedicels 3 mm. long, involueral bracts 0. Calyx teeth obsolete. Petals ovate $\frac{2}{3}$ mm. long, acute produced to an inflexed acumen, emarginate at the apex. Stylopod convex. Fruits broadly ovate, laterally compressed, constricted on the commissure. Carpels 5-gonous, jugs equally prominent, obtuse, carpophors 2-fid at the apex.

HAB. Maruyama.

5. *Pimpinella* LINN.

Key to the Formosan Species.

- (1) Plants very much smaller, pinnæ of the radical leaves nearly rounded, serrate. *P. Saxifraga*.
Plants much larger, pinnæ usually ovate, acuminate, serrate.
..... *P. diversifolia*.

Pimpinella diversifolia DC.; HAYATA Mater. Fl. Formos. p. 126.

HAB. Taitō: Shinkōkō.

DISTRIB. Japan, China, and common on the mountains of North India.

OBSERV. A glabrous herb, 50-70 cm. high, striate, leaves trifoliate, long petioled, lateral leaflets nearly sessile, obliquely ovate, acuminate at the apex, round at the base, $4\frac{1}{2}$ cm. long 3 cm. broad, terminal one ovately lanceolate 5 cm. long 3 cm. broad, acuminate at the apex, cuneate or sometimes rotundate at the base, serrate, pubescent, petiolulate, petiohles 1 cm. long, trinerved, petioles of the leaves of the basal portion very long 7 cm. long, base of the petioles dilated embracing the stem, leaves of the upper portion are shortly

petioled, petioles dilate along its length, and embracing the stem. Involucral leaves linear 5 mm. long. Umbels 5 mm. long as broad, carpels ovately semiglobose $1\frac{1}{4}$ mm. long, $\frac{2}{3}$ mm. broad, thinly 5-striate, nearly round in section.

Pimpinella Saxifraga LINN.; HAYATA Mater. Fl. Formos. p. 128.

HAB. Mt. Morrison.

DISTRIB. Europe, northern and western Asia.

OBSERV. A very small perennial herb; rhizome erect, stem pubescent or subglabrous rarely branched, 15–20 cm. high; radical leaves (including petioles) 8 cm. long, $1\frac{1}{2}$ cm. broad, pinnate, pinnae 4–5 juged, with terminal one, or sometimes bipinnate, lateral leaflets opposite, rotundate, 1 cm. long as broad, subsessile or shortly stalked, dentate, petioles 4 cm. long; cauline leaves $5\frac{1}{2}$ cm. long, bipinnate or bipinnatifid, leaflets 3–4-juged, oblong in outline, $1\frac{1}{2}$ cm. long 1 cm. broad, 3–5-lobed, lobes lanceolate, acute, terminal lobe usually many-cleft. Umbels 7-radiate; umbellules small, peduncles 2 cm. long, carpels ovately semiglobose, thinly 5-ribbed, $1\frac{2}{3}$ mm. long, nearly round in section. An extremely tiny form of the species.

6. *Osmorrhiza* RAFIN.

Osmorrhiza longistylis HAYATA Mater. Fl. Formos. p. 131.

HAB. Mt. Morrison.

DISTRIB. North America.

7. *Oreomyrrhis* ENDL.

Oreomyrrhis involucrata HAYATA Materials for a Flora of Formosa p. 128; HAYATA Ic. Pl. Formos. Pl. XL. Perennial herb, caespitose, pubescent, stem scape-like, 7 cm. long. Leaves all radical, pinnate or bipinnate, 4 cm. long (including petioles) 2 cm. broad, membranaceous, superior pinnae sessile obovate 8 mm. long 4 mm. broad, long cuneate at the base, trilobed, lobes lanceolate, middle pinnae obscurely petiolulate, lower pinnae distinctly petiolulate, tri-parted, segments tri-lobed, petiolules 4 mm. long, petioles 2 cm. long, base dilated scaly. Scapes 6 cm. long, pubescent. Involucral bracts 10, 2-seriate, nearly 5 of them longer, the other 5 shorter, longer one linear, $2\frac{1}{2}$ cm. long $1\frac{1}{2}$ mm. broad, 3-fid at the apex, segments 5 mm. long,

lanceolate divaricate, shorter ones lanceolate 5 mm. long. Umbels simple, nearly 10, radiate, 8 mm. long 10 mm. in diameter. Flowers small, pedicels 6 mm. long, pubescent.

Calyx-teeth obsolete, petals oblong, $\frac{3}{4}$ mm. long, acute, shortly incurved at the apex, entire. Stylopod subconical. Fruits oblong-linear, 4 mm. long, contracted at the apex, slightly laterally compressed, nearly constricted at the commissure, rubro-nigricant when dried. Carpels 5-gonous in section, jugally equally distinctly prominent lateral distinct; vitte solitary on vallicules. Carpophores biparted. Seeds subterete, face sulcate.

HAB. Mt. Morrison.

Very distinct species, remarkable for its long bracts. Somewhat near *O. anticola* ENGL., but differs in having linear involueral bracts which are very much longer than the fruiting pedicels.

8. *Fœniculum* JOURN.

Fœniculum vulgare MILL.; MATSUM. et HAYATA Enum. Pl. Formos. p. 171.

HAB. South Cape.

9. *Phellopterus* BENTH.

Phellopterus littoralis BENTH.; HAYATA Mater. Fl. Formos. p. 128.

DISTRIB. Saghalin, Japan and China.

I have seen this species in the Herbarium at Hongkong, and remember having seen the plant in Formosa. But, it is not yet represented in the Herbarium at Tōkyō.

10. *Oenanthe* LINN.

Key to the Formosan Species.

- (1) Leaflets or pinnules linear entire. *O. linearis*.
 Leaflets or pinnules more or less serrate lanceolate or oblong. (2)
- (2) Leaflets lanceolate acutely serrate. *O. stolonifera*.
 Leaflets ovate more or less lobed serrate. *O. benghalensis*.

Oenanthe benghalensis BENTH.; MATSUM. et HAYATA Enum. Pl. Formos. p. 172.

HAB. Taihoku, Tamsui.

DISTRIB. Southern China, Eastern India.

Cenanthe linearis WALL.; MATSUM. et HAYATA Enum. Pl. Formos. p. 172.

HAB. Taichū; Taibōho, Sekihikyaku, Pachina, Taitou.

DISTRIB. India, Nepal, Southern China.

Cenanthe stolonifera DC.; MATSUM. et HAYATA Enum. Pl. Formos. p. 172.

HAB. Wantan, Heiteishō, Taikanaihoshō, Tamsui.

DISTRIB. China, Eastern India.

11. *Ligusticum* LINN.

Ligusticum acutilobum SIEB. et ZUCC.; MATSUM. et HAYATA Enum. Pl. Formos. p. 173.

HAB. Kelung.

DISTRIB. Japan and Corea.

12. *Cnidium* CUSSON.

Cnidium formosanum YABE; MATSUM. et HAYATA Enum. Pl. Formos. p. 175.

HAB. Taichū, Kagi.

13. *Angelica* LINN.

Key to the Formosan Species.

Leaflets or pinnules obovate, grossly dentate. *A. morrisonicola*.

Leaflets or pinnules ovate or more or less elongate minutely dentate.

. *A. kiushiana*.

Angelica kiushiana MAXIM. (determined by Mr. Y. YABE).

HAB. Exact locality is not given. Two specimens are preserved in the Herbarium at Tōkyō.

DISTRIB. Japan and Corea.

Angelica morrisonicola HAYATA Materials for a Flora of Formosa p. 129. Somewhat strong herb, glabrous. Leaves bipinnate, long-petioled, triangular in outline, 25 cm. long 30 cm. broad, petioles 25 cm. long, primary pinnae petiolate, pinnate, petioles 6 cm. long, pinnules shortly petiolulate, oblong, 7 cm. long 3 cm. broad, serrate, petiolules 5 mm. long, sometimes trilobed, terminal pinnule 3-parted, glabrous above, glaucous beneath; petioles of lower leaves dilated at the base, those of upper ones vaginate, longe, oblong, microphylls glabrous. Involucral bracts linear $1\frac{1}{2}$ cm. long. Umbels nearly 50-radiate, rays 4 cm. long. Umbellules involuclate at the base, 8 cm. long as broad, bracteoles linear 2-4 mm. long. Calyx-teeth obsolete. Petals oblong, entire, acumen inflexed. Stylopod depressed entire. Fruits ovate, dorsally strongly compressed, commissures broad. Carpels oblong lenticellate $3\frac{1}{3}$ mm. broad 5 mm. long, rounded at the apex, cordate at the base, dorsal juga filiformed, margin dilated to wings. Seeds compressed dorsally, flattened on the face.

HAB. Mt. Morrison.

Angelica formosana BOISSIEU in Bullet. Soc. Bot. Fr. LVI. (1909) p. 355.

HAB. Maruyama.

I have not yet seen the plant.

14. *Peucedanum* LINN.

Key to the Formosan Species.

- (1) Lobes of pinnule or pinnule entire. *P. japonicum*.
Lobes of pinnule or pinnule serrate or incised. (2)
- (2) Pinnules incised. *P. terebinthaceum*.
Pinnules serrate. (3)
- (3) Serratures obtuse. *P. decursivum*.
Serratures acute. *P. graveolens*.

Peucedanum decursivum MAXIM.; MATSUM. et HAYATA Enum. Pl. Formos. p. 173; HAYATA Mater. Fl. Formos. p. 130.

HAB. Tamsui, Kelung.

DISTRIB. Korea, Japan, Southern China.

Peucedanum graveolens HAYATA Mater. Fl. Formos. p. 130.

HAB. Byōritsu.

DISTRIB. Cultivated in North China.

Peucedanum japonicum THUNB.; MATSUM. et HAYATA Enum. Pl. Formos. p. 174.

HAB. Senton.

Peucedanum terebinthaceum FISCH.; HAYATA Mater. Fl. Formos. p. 131.

HAB. Mt. Morrison, Musha, Tappansha.

DISTRIB. China, Corea, Dahuria, Mandshuria.

15. *Coriandrum* LINN.

Coriandrum sativum LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 174.

HAB. Shintiku, cultivated.

DISTRIB.

16. *Torilis* DC.

Torilis Anthriscus BENTH.; MATSUM. et HAYATA Enum. Pl. Formos. p. 174.

HAB. Pachina, Tamsui.

DISTRIB. Europe, China, Korea, Siberia, Eastern India, Northern Africa.

60. Araliaceæ.

Conspectus of the Formosan Genera.

Petals slightly imbricate. Pedicels jointed. Araliæ. (1)

Petals valvate. Albumen uniform. Panaceæ. (2)

Petals valvate. Albumen ruminated. Hedereæ. (5)

(1) Styles 2-5, free. Leaves compound. *Aralia*. 1

(2) Ovary 2-celled. (3)

Ovary 4-10 celled. (4)

- (3) Leaves digitate. *Acanthopanax*. 2
 Leaves ample, palmately lobed. *Fatsia*. 3
 (4) Umbels sessile on the back of leaves, leaves simple..... *Helwingia*. 4
 Umbels racemosely arranged, terminal. *Heptapleurum*. 5
 (5) Leaves simple, flowers sessile in heads; heads paniculate. *Oreopanax*. 6
 Leaves simple, pedicels continuous, flowers pedicelled, not in heads.
 *Hedera*. 7

1. *Aralia* TOURN.

Key to the Formosan Species.

- (1) Leaves beset with spines on petioles, leaflets dentate..... *A. spinosa*.
 Leaves unarmed leaflets repandate on the margin, not dentate.
 *A. hypoleuca*.

Aralia hypoleuca PRESL.; HAYATA Mater. Fl. Formos. p. 131.

HAB. Shintengai, Akō, Bongarisha, Uraisha, Arisan.

DISTRIB. Philippines.

OBSERV. According to W. B. HEMSLEY (Ind. Fl. Sin. I. p. 338), the present species is the same as *A. spinosa* which is in itself very variable.

Aralia spinosa LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 176.

HAB. Hikaku, Tamsui.

DISTRIB. Philippines, Japan, China, Northern America.

2. *Acanthopanax* MIQ.

Acanthopanax aculeatum SEEM.; MATSUM. et HAYATA Enum. Pl. Formos. p. 176; HAYATA Fl. Mont. Formos. p. 104.

HAB. Tappaisha.

DISTRIB. Eastern India, Central China and Japan.

3. *Fatsia* DECNE et PLANCH.*Key to the Formosan Species.*

Leaves enormously large, beneath covered with cotton wools, lobes entire.

.....*F. papyrifera*.

Leaves glabrous on both sides, lobes serrately dentate.....*F. polycarpa*.

Fatsia papyrifera BENTH. et HOOK.; MATSUM. et HAYATA Enum. Pl. Formos. p. 177.=***Tetrapanax papyrifera*** C. KOCH.

HAB. Suiteiryō, Niki, Kelung, common in many other places.

DISTRIB. An endemic plant.

Fatsia polycarpa HAYATA Fl. Mont. Formos. p. 105. Tall shrub. Branches at first covered with brownish soft lanate tomentum, hairs long, at last subglabrous. Leaves (at first brownish lanate, at last glabrous) ample, long petiolate, petioles as long as or shorter than blades, base strongly dilate, ciliate, stipules slightly prominent within petioles, blades broadly orbicular in outline, 15-30 cm. in diameter, deeply palmately 7-fid, deeply sinuate between lobes, lobes oblongly obovate caudately acuminate at the apex, narrowed at the base, margin (excepting apical and basal parts, and sinus) dentately serrate, serratures mucronately acuminate, ascendent, palmately 7-nerved, beneath prominently nerved pallid. Umbels paniculate, panicles terminal 30-40 cm. long, densely fulvo-lanate, branches (lowest) 14 cm. long, umbels pedunculate, peduncles $1\frac{1}{2}$ cm. long, as long as umbels; bracts at the base of umbels ovate $1-\frac{1}{2}$ cm. long, membranaceous deciduous densely lanate; bracteoles minute linear. Umbels nearly 20-flowered, globose in flower-buds, buds 1 cm. in diameter, covered with lanate tomentum, umbels at last patent $1\frac{1}{2}$ cm. long, $2\frac{1}{2}$ cm. in diameter. Flowers when expanded 7 mm. in diameter long pedicelled, pedicels 1 cm. long slender continued to flowers, but articulate at the base on the peduncles. Calyx-tube short, slightly 10-sulcate, margin prominent. Petals 5, membranaceous, valvate extrorsely revolute, long triangular mucronate and acute at the apex, $3\frac{1}{2}$ mm. long, base scarcely broader than 2 mm. Stamens 5, filaments filiformed longer than petals, patent, reflexed, anthers oblong. Disc

convex margin entire. Ovary 10-celled, cells 1-ovuled. Styles 10 distinct from the base, very short $\frac{1}{2}$ mm. long, stigmas terminal small.

HAB. Mt. Morrison, Mt. Arisan.

I saw the plant in Mt. Arisan where it is quite common. The habit is just like the Japanese species, but far much taller.

DISTRIB. An endemic plant, the only congeners we have at present are *F. japonica* DECNE et Pl. and *F. papyrifera* BENTH. et HOOK. f. The former occurs in Japan and the latter in Formosa.

4. *Helwingia* WILLD.

Helwingia rusciflora WILLD. ; HAYATA Fl. Mont. Formos. p. 106.

HAB. Mt. Morrison.

DISTRIB. Japan and Central China.

5. *Heptapleurum* GERTN.

Key to the Formosan Species.

Flowers simply racemose. *H. racemosum*.

Flowers in umbels, umbels in racemes. *H. octophyllum*.

Heptapleurum octophyllum BENTH.* et HOOK. f.; HAYATA Fl. Mont. Formos. p. 107.

HAB. Mt. Morrison, Kelung, Paolina, Holisha, Tamsui.

DISTRIB. South China and the Loo-choo islands.

The plant grows usually in the low regions and sometimes ascends to an elevation of 3000 m.

Heptapleurum racemosum BEDD.**; HAYATA Fl. Mont. Formos. p. 107.

HAB. Mt. Tozan, Mt. Arisan.

DISTRIB. The plant grows in the mountainous districts of Southern India, such as Nilghiries, at elevations of 3000-5000 ft. and also in those

* *Schefflea octophylla* HARMS.

***Schefflea racemosa* HARMS.

of Ceylon at altitudes of 3000–5000 ft. (after BEDDOME); but not found in Himalaya.

6. *Oreopanax* DECNE. et PL.

Oreopanax formosana HAYATA Fl. Mont. Formos. p. 108. Arborescent shrub, branches cinereo-stellato-tomentose or adpressingly pilose. Leaves ample long petiolate, petioles at first adpressingly stellately pilose, at last subglabrous, 1–2-times longer than blades, base dilated, stipules slightly prominent acute, connate to the base of the petioles, blades broadly orbicular in outline 20 cm. long 23 cm. broad or smaller, base broadly truncate or cordately truncate, margin obsolete 3–5-lobate or grossly irregularly dentate, teeth acute, sinuate between the teeth, 5–7-nerved, above subglabrous, veins impressed, beneath densely covered by stellate hairs, veins and veinlets prominent. Flower-heads corymbose-paniculate. Panicles terminal, 15 cm. long, as long as petioles, 13 cm. broad, densely covered by hairs, (hairs stellate or simple), branches alternate, divaricate at an obtuse angle, heads pedunculate, peduncles opposite, ternate, or alternate, bracts at the base of peduncles broadly ovate 4 mm. long; bracteoles scale-shaped, thick 3 under each flower, one of them larger broadly ovate 3 mm. long, 2-lateral ones smaller opposite covered by long dense hairs, at the same time bearded. Heads subglobose, 6–7 mm. in diameter, nearly 15-flowered, 2-times longer than peduncles. Flowers all villose, sessile, buds subturbinate $2\frac{1}{2}$ mm. long. Calyx margin obsolete dentate. Petals 5 valvate, inside glabrous ovately triangular, $1\frac{1}{2}$ mm. long or longer deciduous. Stamens 5, filaments short, anthers oblong; disc expanded. Ovary 2-celled, cells 1-ovuled, styles 2, short distinct, erect, stigma terminal. Fruits broadly globose, $4\frac{1}{2}$ mm. long 5 mm. broad smooth, by abortive 1-seeded, compressed, tomentose drupaceous, styles persistent, very recurved. Seeds ovoid subtriqueter 4 mm. long, albumen ruminate. Embryo near hilum, minute.

HAB. Bataiankei, Mt. Arisan.

It is stated in "BENTH. et HOOK. f. Gen. Pl. I. p. 939" that the ovary of the genus *Oreopanax* is 5-celled. But this generic character is a little broadened in "ENGL. ñ PRANTL. Nat. Pfl.-fam. III.-8 p. 39"

to such an extent that the ovary is sometimes 2-celled and the flower is usually hermaphrodite. Accepting the latter statement, the present plant which has two-celled ovary should be referred to *Oreopanax*, on account of capitate and sessile flowers, ruminant albumen, simple leaves and the existence of three bracts under each flower. The style of this plant is exceptionally short. The occurrence of this American genus in the island is very remarkable. Another species was recently recorded from China by Mr. S. T. DUNN. The species differs from ours in having digitate leaves.

7. *Hedera* LINN.

Hedera Helix LINN.; HAYATA Fl. Mont. Formos. p. 110.

HAB. Tappansha.

DISTRIB. Western Europe and North Africa eastward to Japan.

Species imperfectly known to me.

Panax fruticosum LINN.; HENRY List Pl. Formos. p. 48.

Dendropanax sp. HAYATA Fl. Mont. Formos. p. 110. = **Gilibertia pellucidopunctata** HAYATA.

HAB. Mt. Morrison, Mt. Arisan.

61. Cornaceæ.

Conspectus of the Formosan Genera.

| | | |
|----------------------------|-----------------|---|
| Flowers hermaphrodite..... | <i>Marlea</i> . | 1 |
| Flowers unisexual..... | <i>Acuba</i> . | 2 |

1. *Marlea* ROXB.

Key to the Formosan Species.

| | |
|-------------------------------------|--------------------------|
| Leaves entire, not lobed..... | <i>M. begoniæfolia</i> . |
| Leaves lobed, lobes divaricate..... | <i>M. platanifolia</i> . |

Marlea begoniæfolia ROXB.; HAYATA Fl. Mont. Formos. p. 111.

HAB. Mucensha, Urai.

DISTRIB. India, Malay, southern and central China and Japan.

Marlea platanifolia SEEB. et ZUCC.; MATSUM. et HAYATA Enum. Pl. Formos. p. 179.

HAB. Basal region of Mt. Morrison; Taiko.

DISTRIB. Japan.

2. *Aucuba* LINN.

Aucuba japonica THUNB.; HAYATA Fl. Mont. Formos. p. 111.

HAB. in Mt. Morrison.

DISTRIB. From middle Himalaya through Central China to Japan and the Korean archipelago.

The flowers of the Formosan plant are much larger and the leaves are narrower, with more diverging veinlets; I think the plant may be regarded as a form of the Japanese species.

- (13) Flowers regular. (14).
 Flowers irregular. (37).
- (14) Stamens hypogynous. (15).
 Stamens epipetalous. (18).
- (15) Ovary 1-celled, ovule 1, pendulous. Herbs.....Plumbagineæ.
 Ovary 5-celled, cells many-ovuled. (16).
- (16) Trees, shrubs or shrubby herbs, leafy. (17).
 Leafless herb, parasite.Monotropeæ.
- (17) Anthers opened by terminal pores.Ericaceæ.
 Anthers opened by longitudinal slits.Diapensiaceæ.
- (18) Ovary of two free carpels with connate styles or stigmas, or carpels
 separable. Carpels not confluent. (19).
 Ovary of two or more confluent carpels. (21).
- (19) Leaves opposite. (20).
 Leaves alternate, carpels each 2-lobed.....Apocynaceæ, (*Cerbera*).
- (20) Pollen grains free,Apocynaceæ.
 (in *Melodinus* carpels confluent, in *Rauwolfia* they are partly confluent).
 Pollen in waxy or granular masses.Asclepiadeæ.
- (21) Ovary 1-celled, placenta free central, stamens opposite colla-lobes (22).
 Ovary 1 or more celled, placenta not free central. (23).
- (22) Herbs, fruits capsular.....Primulaceæ.
 Trees or shrubs, fruits baccate or somewhat baccate, not dehiscing....
Myrsineæ.
- (23) Leaves opposite, rarely ternate. (24).
 Leaves alternate or all radical. (29).
- (24) Trees or shrubs. (25).
 Herbs. (28).
- (25) Stamens 2, ovary 2-celled, cells 1-ovuled.Oleaceæ.
 Stamens 4-5. (26).
- (26) Anthers connivent, adnate to stigmas.Apocynaceæ.
 Anthers free. (27).
- (27) Ovary 1-4-celled, placenta axile or sub-basal. (28).
 Ovary 1-celled, placenta parietal, ovules very many...Gentianaceæ.

- (28) Stamens didynamous. Verbenaceæ.
 Stamens equal. Loganiaceæ.
 (in *Mitrasacme* Ovary 2-celled, cells many-ovuled, stamens 5).
- (29) Aquatic herb, leaves floating, ovary 1-celled. Gentianaceæ,
 (*Limnanthemum*).
 Terrestrial. (30).
- (30) Herb with cauline leaves, or shrubs or trees. (31).
 Herb. with all radical leaves. Plantagineæ.
- (31) Ovary 1-celled, ovules many, placenta parietal, undershrubs
 Gesneraceæ, (*Isanthera*).
 Ovary 2- or more-celled. (32).
- (32a) Ovary 2-4-celled, ovules 4. (33).
 β) Ovary 2-celled, cells many-ovuled. (33a).
 γ) Ovary 2-6-celled, cells 1-2 ovuled, shrubs or trees. (34).
- (33a) Styles 2. Hydrophyllaceæ.
 Styles 1. Solanaceæ.
- (33) Corolla plaited in bud. Convolvulaceæ.
 Corolla-lobes imbricate in bud. Boragineæ.
- (34) Flowers bisexual. (35).
 Flowers unisexual or polygamous. (36).
- (35) Leaves simple. (35a).
 Leaves compound. Ampelideæ, (*Lera*).
- (35a) Ovary-cells 1-ovuled. Sapotaceæ.
 Ovary-cells more than 2-ovuled. Styraceæ.
- (36) Petals contorted, sepals accrescent. Ebenaceæ.
 Petals imbricate. Oleaceæ.
- (37) Leafless herbs. (38).
 Leafy herbs, shrubs, or trees. (40).
- (38) Stamens 4, didynamous, anthers 1-2-celled. (39).
 Stamens 2, anther-cells confluent. Lentibulariaceæ.
- (39) Ovary 1-celled, placenta 2, parietal. Orobanchaceæ.
 Ovary 2-celled, placenta 2, axile, anthers 1-celled. Scrophulariaceæ,
 (*Striga*).

- (40) Anther 1-celled, ovary 4-parted. Labiatae.
 Anther 2-celled. (41).
- (41) Anther confluent. (42).
 Anther distinct. (44).
- (42) Ovary 1-celled. (43).
 Ovary 2-celled, leaves opposite. Scrophulariaceæ (*Microcarpea*).
- (43) Stamens 2 or 4, placenta 2, parietal. Gesneraceæ.
 Stamens 2, placenta basal. Lentibulariaceæ.
- (44)*a*) Ovary 1-celled, but seemingly 2-celled by confluence of placenta, trees,
 leaves pinnate, stamens didynamous. Bignoniaceæ.
β) Ovary 2-celled, leaves usually opposite, simple, lobed or pinnatifid,
 stamens usually didynamous. (45).
γ) Ovary 4-celled, leaves opposite stamens didynamous. (48).
δ) Ovary 5-10-celled, leaves alternate, stamens 4, shrubs... Myoporineæ.
- (45) Ovary-cells many-ovuled, fruits usually capsular. (46).
 Ovary-cells 1-few-ovuled. (47).
- (46)*a*) Leaves opposite, alternate, or whorled, seeds without hooks, endosperm
 fleshy Scrophulariaceæ.
β) Leaves opposite or alternate, seeds without hook, endosperm 0.....
 Pedalineæ, (*Sesamum*).
γ) Leaves all opposite, seeds with hook in the placenta, endosperm 0.....
 Acanthaceæ.
- (47) Leaves opposite or whorled, fruit dry or a drupe..... Verbenaceæ.
 Leaves all opposite, capsule 2-valved. Acanthaceæ.
- (48) Ovary entire, style terminal. Verbenaceæ.
 Ovary 4-parted, style from between the lobes. Labiatae.

62. Caprifoliaceæ.

Conspectus of the Formosan Genera.

- (1) Corolla-limb regular, style short, 2-5-lobed; ovary-cells 1-ovuled. (2).
 Corolla-limb regular or irregular, style long, stigma capitate. (3).
- (2) Leaves pinnate; leaflets 5-9, serrate..... *Sambucus*. 1

- Leaves undivided. *Viburnum*. 2
 (3) Calyx-lobes elongate. Fruits elongate coriaceous, 1-seeded. ... *Abelia*. 3
 Calyx-lobes not elongate. Flowers usually in pairs. Fruits berry, 2-
 3-celled. *Lonicera*. 4

1. *Sambucus* TOURN.

Sambucus javanica BLUME; MATSUM. et HAYATA Enum. Pl. Formos. p. 179.

HAB. Kelung, Sharyōtō, Pachina, Tamsui, Mankinshō, Garambi.

DISTRIB. China, Eastern India, Malaya and Java.

Viburnum LINN.

Dichotomous Key to the Formosan Species.

- (1) Leaves coriaceous, entire or slightly serrate towards the apex, but entire towards the base. (2).
 Leaves chartaceous or membranaceous, dentate or serrate, or nearly or quite entire. (4).
 (2) Leaves obovate obtuse or obtusely acuminate, cuneate at the base.
 *V. odoratissimum*.
 Leaves oblong elliptical obtuse or acute or emarginate at the apex, obtuse or rounded at the base. (3).
 (3) Leaves serrulate or serrate acute at the apex. *V. taitense*.
 Leaves crenulately serrulate or slightly serrate. *V. Sandankwa*.
 (4) Leaves very much smaller obovately rhomboid grossly dentate 3 cm. long. *V. parvifolium*.
 Leaves larger, longer than 4 cm. (if shorter, leaves nearly entire). (5).
 (5) Leaves nearly 4 cm. long, nearly entire, branchlets divaricate at the right angle. *V. rectangulare*.
 Leaves more than 4 cm., branchlets diverging at an acute angle. (6).
 (6) Leaves broadly ovate shallowly dentate 6½ cm. long, 5 cm. broad.
 *V. formosanum*.
 Leaves ovate, more or less acuminate. (7).

- (7) Leaves much larger 16 cm. long, 6 cm. broad, serrulate, or nearly entire, acuminate. *V. taiwanianum*.
 Leaves smaller, nearly 6 cm. long, dentate or entire. (8).
- (8) Leaves entire, lanceolate. *V. integrifolium*.
 Leaves dentate, ovate. (9).
- (9) Leaves glabrous rhomboid-ovate. *V. morrisonense*.
 Leaves hirsute or densely pubescent, much elongate, acuminate.
 *V. luzonicum*.

Viburnum formosanum HAYATA (Pl. I.) Mater. Fl. Formos. p. 132.

Rami recti, angulato-teretes, cinerascetes, ramulis brevibus oppositis, pubescentibus, basi peruliferis, perulis brevibus, pilosis, apice 2-foliatis, cymis terminalibus. Folia opposita petiolata ovato-rhomboidea, 5 cm. longa 4 cm. lata, apice acuta, basi late cuneato-acuta, vel acuta, vel rotundato-truncata, margine breviter dentata, ad apicem dentium mucronata, utraque pagine pauce pubescentia, demum subglabrata, subtus pallidiora, extipulata, petiolis 6 mm. longis. Cymæ terminales, solitariae vel umbellatim caespitosæ, pilosæ 3 cm. longæ, totiusque latæ, semiglobosæ, umbellatim 2-3-plo ramosæ, pedicellis 1-2 mm. longis, sub pedicellis singulis 1-bracteatis, bracteis $1\frac{1}{3}$ mm. longis extus pubescentibus intus glabris margine ciliatis linearibus obtusis, pedicellis apice cum calycibus articulatis. Calyx campanulatus extus stellato-pilosus, intus glaber, tubo cum ovario adnato 1 mm. longo, limbo 5-lobato, lobis oblongo-triangularibus $\frac{1}{2}$ mm. longis obtusis ciliolatis. Corolla rotata, 4-5 mm. in diametro, 5-lobata, lobis rotundatis $1\frac{1}{3}$ mm. longis. Stamina 5, basi corollæ coherentia, filamentis complanatis 2 mm. longis $\frac{1}{3}$ mm. latis, apice constrictis, angustissimis, antheris rotundatis utrinque emarginatis. Ovarium fere inferius, stylo brevi, conico $\frac{2}{3}$ mm. longo, stigmate 3-lobato?

HAB. Tamsui, Sôzû.

DISTRIB. An endemic plant.

The present plant is quite referable to HANCE's var. *formosanum*. The variety, however, has not any stipule, while *V. erosum* has a distinct stipul, as is mentioned by MAXIMOWICZ "Mél. Biol. X. p. 666." As the Formosan plant differs from the latter species in many other points, it is quite proper to regard it as a plant specifically distinct from *V. erosum* THUNB.

Viburnum integrifolium HAYATA (Pl. II.) Mater. Fl. Formos. p. 132; Branches and branchlets slender, divaricate, gray-brown, glabrous. Leaves opposite, petiolate, ex stipulate, oblong or oblong-lanceolate, 9 cm. long, $2\frac{1}{2}$ cm. broad, suddenly acuminate at the apex, (acuminated part 2 cm. long.) acute at the base, entire, veins and veinlets obscure on the upper surface, prominent on the lower surface, veins erect-patent and connected near the margin, veinlets transversely connected, not prominent on both surfaces, smooth glossy above, almost dark in dried specimens, pale below, petioles 7 mm. long. Cymes terminal, many-branched at the apex, pubescent, branches verticillate. Flowers $3\frac{1}{2}$ mm. in diameter; calyx-tube 1 mm. long, margin patent and 5-lobed, lobes triangular, acute, $\frac{1}{2}$ mm. long. Corolla broadly campanulate patent, 4 mm. in diameter smooth deeply 5-lobed, lobes ovate-rounded, 1 mm. long rounded at the apex. Stamens 5, inserted at the base of the corolla, filaments 1 mm. long. Styles $\frac{3}{4}$ mm. long, broadly-conical at the base. Drupes ovoid, fleshy, $7\frac{1}{2}$ mm. long, 1-seeded. Putamen like plano-convex lens, ventral side slightly concave.

HAB. Mt. Morrison; Taiko.

Very near *V. sambucinum* REINV.; but differs from it in having quite glabrous and much smaller leaves. Also near *V. sempervirens* C. KOCH, and *V. coriaceum* BLUME, but differs from the former in having narrower leaves with different venation and looser racemes, and from the latter by the smaller leaves and very much smaller flowers.

Viburnum luzonicum ROLFE in Journ. LINN. Soc. XXI. p. 310; HAYATA Mater. Fl. Formos. p. 133.

HAB. Fukkishō; Hikaku.

DISTRIB. The Philippines.

The present plant was previously referred to *V. erosum* THUNB. by myself. After comparison of this plant with the Philippine plant, I found that they are quite similar. *Viburnum erosum* recorded from Formosa by Mr. W. B. HEMSLEY may, I infer, be the same as the Philippine plant.

Viburnum morrisonense HAYATA Mater. Fl. Formos. p. 133. Branch strong, pale brown, more or less rugulose, branchlets opposite, furcate, falcately

recurved, with annular scars of petioles, glabrous. Leaf-buds broadly, globose, scales a few and somewhat larger, ovate, acute, glabrous. Leaves on the apex of branchlets 2, opposite, chartaceous, acuminate-ovate, 5-6 cm. long $3\frac{1}{2}$ cm. broad, acute at the apex or acuminate, round-obtuse or rounded, at the base slightly crenate-serrate on the margin, nearly entire near the base, serratures broad and short, mucronate at the apex, pinnately veined, lateral veins erect and reaching the apex of serratures, veinlets transversely reticulate, costas and veins slightly impressed on the upper surface, slightly prominent on the lower surface, nearly glabrous on both sides, but pubescent on the costas and veins, beneath shortly barbate on the ramification of the veins, pale beneath, petioles $2\frac{1}{2}$ cm. long patent. Drupes 5-6-fasciculate on the upper branchlets, long pedunculate, slightly glabrous, 8 mm. long. Putamen oblong, 6 mm. long, very complanate, longitudinally elevate on the back, broadly sulcate on the middle of the face.

HAB. Mt. Morrison.

Near *V. betulifolium* BATAL; but differs from it in having much larger putamen, and also in the leaves rounded at the base. Also near *V. dilatatum* and *V. Wrightii* MIQ; but differs from the former in having quite or nearly glabrous leaves, a very few flowered cymes, and quite glabrous peduncles, and from the latter in having not caudate smaller leaves and less flowered-peduncles. The leaves of *V. dilatatum* is densely hairy beneath, while those of the present plant are quite glabrous beneath, except the midrib and veins.

Viburnum odoratissimum KR.; DC. Prodr. IV. p. 326; MATSUM. et HAYATA Enum. Pl. Formos. p. 180.

HAB. Eotansha, Mankinsbō, Garambi.

DISTRIB. Japan, China, Eastern India.

Viburnum parvifolium HAYATA Mater. Fl. Formos. p. 134. Branches and branchlets slender, dark gray, branchlets divaricate, ramose, densely covered with branched hairs. Leaves opposite, ex-stipulate, petiolate, obovate or ovate, 28 mm. long 15 mm. broad, acute at the apex, cuneate and obscurely tri-lobate or not lobed at the base, dentate on the margin, covered with branched hairs on both surfaces, pale below, veins slightly impressed on the

upper face, primary lateral veins erect and reaching the apex of serratures, veinlets reticulate, petioles hispidulous, 5 mm. long. Flowers in terminal paniculate-cymes. Drupe fleshy, globose, 6 mm. in diameter, 1-seeded. Putamen ovate, $6\frac{1}{2}$ mm. long and 4 mm. broad, acute at the apex, emarginate at the base, complanate and slightly and prominently 1-costate on the back, sulcate on the face.

HAB. Mt. Morrison.

Remarkable for very small size of the leaves.

Viburnum phlebotrichum SIEB. et ZUCC.; MATSUM. et HAYATA Enum. Pl. Formos. p. 180.

HAB. Kelung.

DISTRIB. Japan, Central China.

OBSERV. The species is recorded from Formosa by Dr. A. HENRY; but I have not yet been able to see the plant in the island. I rather doubt its existence in Formosa.

Viburnum rectangulare GREEN. in Engl. Bot. Jahrb. XXIX. p. 588; HAYATA Mater. Fl. Formos. p. 135.

HAB. Mt. Morrison; Mt. Arizan.

DISTRIB. South Central China.

The present plant has rather smaller leaves which is ovate, 4 cm. long 17 mm. broad, acute at both ends, remotely mucronato-serrate or entire.

Viburnum Sandankwa HASSK.; HAYATA Mater. Fl. Formos. p. 135

HAB. Ōshima; Nase; Yeyama.

DISTRIB. Kiangsu; Loo-choo islands.

Viburnum taitōense HAYATA Mater. Fl. Formos. p. 136. Branchlets slender, dark-brownish purple, longitudinally rugulose, fusco-tomentose, with reddish lenticels, terete, remotely foliate. Leaves opposite, oblong-lanceolate or oblong-elliptical, 9 cm. long and 3 cm. broad, acuminate at the apex, acute at the base, margin serrulate, serratures rounded-mucronate, pinnately nerved, veins 5-6, arcuate, costa and veins impressed on the upper surface, veinlets slightly impressed, costa and veins prominent on the lower surface,

thinly chartaceous or coriaceous, very glabrous on the both surfaces, lower surface pale, petioles $1\frac{1}{2}$ cm. long broadly sulcate on the upper side rubescent. Flowers in corymbs, corymbs terminal, 3 cm. long as broad, branches yellowish-brown tomentose, hairs short and dense, bracts narrowly acute, 2-3 mm. long, pedicels short, articulate with the calyx, 1-2 flowered on the apex of the pedicels, bracteoles 2-3-congested, embracing the base of the calyx, elongate angular acute ciliate. Flowers about 1 cm. long tubulose. Calyx tubuloso-campanulate, pubescent on the outer side, tube 2 mm. long, limb campanulate glabrous on the inner side, slightly 5-lobed, lobes short, obtuse-triangular, $\frac{2}{3}$ mm. long, obtuse at the apex, ciliate on the margin. Corolla tubiformed, slightly ampliate on the upper part, 9 mm. long, tube 5 mm. long, limb 5-lobed, lobes shortly rounded, 2 mm. long. Stamens 5, affixed on the throat of the corolla, filaments short, 1 mm. long. anthers oblong, 1 mm. long. Ovary inferior, 1-celled, style simple, incrassate, nearly 2 mm. long gradually and slightly dilated at the base, 3-lobed on the apex.

HAB. Taitō : Daishinzan.

Near *Viburnum crubescens* WALL., but differs from it in having denser and shorter cymes, narrower leaves, and calyx densely covered with stellate hairs. *V. crubescens* has a nearly glabrous calyx, much broader leaves, and more elongated cymes.

Viburnum taiwanianum HAYATA Mater. Fl. Formos. p. 137. Branches gray-brown, upwards beset with short stellate hairs. Leaves deciduous, opposite, approximately arranged towards the apex of the branches, petiolate, exstipulate, ovate-oblong or ovate-lanceolate, 15 cm. long, $5\frac{1}{2}$ cm. broad, acuminate at the apex (acuminate part 2-3 cm. long), rounded at the base, glabrous, nigricant in dried specimens, pale on the lower surface and beset with short stellate hairs, margin minutely denticulate or nearly entire; primary veins ascending and secondary ones transverse, petioles 2 cm. long. Cymes terminal on branches, peduncles 4 cm. long, branches verticillate, bracts linear, 4 mm. long, bracteoles subulate. Calyx-tube cylindrical, 2 mm. long, margin shortly campanulate, 1 mm. long, 2-lobed, lobes triangular and obtuse, $\frac{1}{2}$ mm. broad. Corolla tubiformed $3\frac{1}{2}$ mm. long, slightly contracted

at the base, 5-lobed at the apex, lobes, rounded triangular and rounded at the apex, $\frac{3}{4}$ mm. broad or more broader, glabrous. Stamens 5, affixed to the base of the corolla, $5\frac{1}{2}$ mm. long, filaments free. Styles conical 1 mm. long.

HAB. Mt. Morrison, Tōzan, Aisan, Nantō: Shojōdaizan, Randaizan; Taitō: Basshishō.

Near *Viburnum urceolatum* SIEB. et ZUCC., but differs from it in having very obscurely toothed, or even entire, more acuminate leaves, and in their venation.

Species imperfectly known to me.

Viburnum cerosum THUNB.; MATSUM. et HAYATA Enum. Pl. Formos. p. 180.

Viburnum phlebotrichum SIEB. et ZUCC.; MATSUM. et HAYATA Enum. Pl. Formos. p. 180.

Abelia R. BR.

Abelia chinensis R. BR.; HAYATA Mater. Fl. Formos. p. 138.

HAB. Taitō: Saidosan.

As the specimen is imperfect, the determination is not satisfactory. This is also near *A. Achersoniana* GREBN.

Lonicera LINN.

Dichotomous Key to the Formosan Species.

- (1) Peduncles 2-flowered, bracts large, foliaceous. *L. japonica*.
 Peduncles 2-many-flowered, bracts narrowed, inconspicuous. (2).
- (2) Leaves gradually acuminate ovate or oblong or lanceolate. (3).
 Leaves abruptly acuminate broadly ovate. *L. affinis*.
- (3) Leaves narrowed, lanceolate glabrous except margin. . . . *L. angustifolia*.
 Leaves ovate ovate-lanceolate hairy *L. macrantha*.

Lonicera affinis HOOK. et ARN. var. ***pubescens*** MAXIM.; MATSUM. et HAYATA Enum. Pl. Formos. p. 181.

HAB. Mt. Taiton; Tamsui.

DISTRIB. Loo-choo islands and Japan.

Lonicera angustifolia HAYATA n. n. Shrubby, branches slender, glabrous, bark reddish-pale and easily come off, internodes 5 cm. long. Leaves opposite, petiolate, lanceolate, $7\frac{1}{2}$ cm. long, 23 mm. broad, gradually acuminate at the apex, rounded at the base, margin entire or minutely denticulate, ciliate, coriaceous-membranaceous, veinlets impressed and reticulate, on the upper surface primary veins anastomosing near the margin, petioles 1 cm. long, ciliate. Flowers in cymes, cymes terminal or axillary, pedunculate, flowers geminate or solitary on each peduncle, peduncles $1\frac{1}{2}$ cm. long. Flowers 1-bracteate and 2-bracteolate at the base, bracts linear 4 mm. long, bracteoles broadly ovate-rounded and ciliate, 1 mm. long. Calyx urceolate 4 mm. long, limb campanulate, 5-lobed, lobes ovate, acute at the apex, with obscurely glandulose serrate. Corolla not yet known. Berry glabrous 7 mm. in diameter.

HAB. Mt. Morrison; Ganzan, in Mt. Morrison; Arizan.

Lonicera affinis var. **angustifolia** HAYATA Mater. Fl. Formos. p. 138.

Differs from *L. affinis* HOOK. et ARN. in having much narrower leaves, lanceolate lobes of the calyx, and many other points.

Lonicera japonica THUNB.; MATSUM. et HAYATA Enum. Pl. Formos. p. 181.

HAB. Pachina, Biōritsu, Maruyama, Tamsui.

DISTRIB. China and Japan.

Lonicera macrantha DC.; MATSUM. et HAYAMA Enum. Pl. Formos. p. 181.

HAB. Pachina, Tamsui.

DISTRIB. Northern India, Mts. Khasia, and China.

63. Rubiaceæ.

Conspectus of the Formosan Genera.

- (1) Ovules numerous in each cell (rarely solitary in *Cephalanthus*) (2).
Ovules solitary in each cell. (7).
(2)α Corolla funnel shaped; stigma simple. Flowers collected into dense globose heads. (Naucleæ). (2*)

- β Inflorescence usually axillary, stigma fusiform, ovary 2-celled.
 *Randia*. 13
- γ Inflorescence usually axillary, stigma fusiform, ovary 1-celled.
 *Gardenia*. 14
- (7) Radicle superior. (8).
 Radicle inferior. (8 ♀).
- (8) Corolla-lobes imbricate or valvate in bud. Stamens inserted on the mouth of the corolla. Fruits drupaceous with 2-many free or cohering pyrenes; seeds cylindric; albumen scanty or 0.
 (Guettardeæ.) (8*)
- Corolla-lobes valvate in bud. Stamens inserted on the mouth of the corolla. Fruits of 2-coeci. Seeds dorsally compressed.
 (Knoxieæ.) *Knoxia*. 18
- (8 ♀) α Corolla-lobes twisted in bud. Ovary 2-4-celled; ovules usually inserted about the middle of the cell, rarely basilar. Fruit a 2-3-celled berry or drupe with 2-4 free or united pyrenes. Seeds usually plano-convex. (Ixoreæ.) (9)
- β Corolla-lobes valvate in bud. Stamens inserted on the mouth or throat of the corolla. Ovules usually inserted below the middle of the cell, and amphitropous. Fruit a 2-4-celled berry, or a drupe with 2-4 pyrenes (Morindeæ.) (10)
- γ Corolla-lobes valvate in bud. Stamens inserted near the mouth of the corolla. Ovules basilar, euneate, anatropous. Drupe with 2 or more pyrenes. (Psychotrieæ.) (11)
- δ Corolla-lobes valvate in bud. Stamens inserted on the throat or the base of the corolla. Style-arms 2-5, papillose all over. Ovules basilar, erect. Fruits capsular, 5-valved, or with 2 dorsally compressed pyrenes, often pendulous from a columella; albumen copious or scanty—climbing plant. (Pæderieæ,)....
Pæderia. 26
- ε Corolla-lobes induplicate-valvate or valvate in bud. Stamens inserted on the throat or base of the corolla. Style-arms fili-

formed. Ovules erect. Fruit drupe, albumen carnosæ. Erect shrubs. (Anthospermeæ.) (8**).

- ζ Corolla-lobes valvate in bud. Ovary 2- rarely 3-4-celled; style entire, stigma capitate or 2-fid, rarely style-arms elongate; ovules attached to the septum of the ovary, amphitropous. Fruits small, dry, capsular or of 2-cocci, or circumscissile at the base. Seeds usually oblong, deeply grooved on the ventral face.—Herb. (Spermacoceæ).....*Spermacoce*. 30

- η Corolla-lobes valvate in bud. Ovary 2-celled, style-arms 2; ovules attached to the base of the septum. Fruits of 2 small coriaceous or fleshy indehiscent lobes. Seeds peltate, usually hollowed ventrally.—Herbs. (Galieæ.) (13)

- (8*) Corolla-lobes imbricate; lobes 2 exterior. *Guetardia*. 16

Corolla lobes valvate..... *Chomdia*. 17

- (8**) Stipules 3-∞ setose *Serissa*. 27

Stipules not setose, but entire or ciliate or dentate. (8***).

- (8***) Prostrate herb. *Nertera*. 28

Shrubs. *Coprosma*. 29

- (9) Flowers panicled or corymbose, bracts coriaceous not sheathing. *Ixora*. 19

Flowers panicled or corymbose, bracts membranous, lower sheathing.

..... *Paretta*. 20

- (10) Calyx-tubes cohering in a head. *Morinda*. 21

Flowers free. *Dammacanthus*. 22

- (11) Flowers in terminal rarely axillary corymbose, or panicled rarely capitate cymes. *Psychotria*. 23

Flowers fascicled, axillary or terminal or solitary. (12).

- (12) Flowers solitary, calyx with 4-7-rather long lobes, creeping herb, leaves cordate *Geophila*. 24

Flowers fascicled, axillary, calyx-limb 3-6-fid, style-arms 3-9, leaves oblong distichous, shrubs. *Lasicanthus*. 25

- (13) Corolla rotate, or shortly campanulate 5-merous. *Rubia*. 31

Corolla rotate, 4-merous. *Galium*. 32

1. *Cephalanthus* LINN.

Cephalanthus occidentalis LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 182.

HAB. Garambi, Rato, Koteishō.

DISTRIB. Western India, Malaya, Northern America.

2. *Adina* SALISB.

Adina racemosa MIQ.; MATSUM. et HAYATA Enum. Pl. Formos. p. 183.

HAB. Garambi.

DISTRIB. Southern Japan and Western China.

3. *Nauclea* LINN.*Dichotomous Key to the Formosan Species.*

- (1) Leaves thinly hairy on both surfaces. (2).
 Leaves glabrous on both surfaces. (3).
- (2) Leaves thin, membranaceous. *N. florida*.
 Leaves coriaceous or chartaceous. *N. formosana*.
- (3) Leaves ovate acuminate at the apex, flower-heads pedunculate, peduncles slender. (4).
 Leaves obovate broader, rounded or shortly acute, flower-heads large nearly sessile. *N. truncata*.
- (4) Leaves not polished above, ovate, primary veins inserted in a much acuter angle. *N. taiwaniana*.
 Leaves polished above, primary veins fewer, inserted nearly transversally. *N. transversa*.

Nauclea formosana MATSUM. in MATSUM. et HAYATA Enum. Pl. Formos. p. 183.

HAB. Taikatei, Biōritsu.

Nauclea taiwaniana HAYATA Mater. Fl. Formos. p. 139. Branches glabrous, strong, fusco-rubescens, with a few lenticels. Leaves opposite,

petiolate, ovate, 10 cm. long, 5 cm. broad, acuminate or suddenly acute at the apex, rounded, truncate or slightly cordate, margin entire or obscurely repandous, primary veins 7 on each side, the middle vein patent at angle 40° from the costa and the basal veins at angle 90° , glabrous on the upper surface, pallid on the lower surface, petioles $3\frac{1}{2}$ cm. long. Flowers in heads, heads globose, axillary, solitary, pedunculate (peduncles $2\frac{1}{2}$ cm. long). Fruits with 2-cocci, cocci narrowly clavate, $5\frac{1}{2}$ mm. long, 2 mm. broad; bracts persistent, complanate at the apex, peltate, pubescent. Seeds linear, testa winged, $3\frac{1}{2}$ mm. long, $\frac{2}{3}$ mm. broad, 2-lobed at the apex.

HAB. Kōshūm : Kankaw.

Nauclea transversa HAYATA Mater. Fl. Formos. p. 139. Branches strong, many branched, bark gray, with lenticels. Leaves opposite, long petiolate, ovate or oblong, 12 cm. long, 5 cm. broad, pallid on both surfaces, suddenly acuminate at the apex, rounded or truncate at the base, primary veins 6-7 on both sides, patent at angle 60° from the costa and the basal veins at angle 90° , petioles 4-5 cm. long. Flowers in heads, heads axillary, solitary, pedunculate (peduncles 3-4 cm. long). Fruits with 2-cocci, cocci clavate, 5 mm. long, $1\frac{2}{3}$ mm. broad, truncate at the apex, acute at the base; bracts peltate, 4 mm. long, peltas 5-lobed. Seeds linear, 3 mm. long, testa winged, 2-lobed at the apex.

HAB. Nanshikiaku.

Near *N. taiwaniana* HAYATA; but distinguishable in the longer leaves, in the paucity of the primary veins which are inserted at a more obtuse angle, and in the unpolished leaves.

Nauclea truncata HAYATA Mater. Fl. Formos. p. 140. Branches gray, with transversal lenticels. Leaves opposite, nearly sessile, oblong, 16 cm. long, 8 cm. broad, obtuse at the apex and base, or truncate at the base, glabrous and pallid in dried specimens, entire, primary veins impressed on the upper surface, prominent on the lower surface, patent at angle 25° from the costa, veinlets inconspicuous and transversally reticulate, stipules oblong and rounded at both ends, 14 mm. long, 8 mm. broad, deciduous. Flowers in heads, heads terminal, glabrous, nearly sessile, 2 cm. in diameter.

HAB. Kōshūn; Kankaw.

Near *N. sessilifolia* ROXB. and *N. reticulata* HAV., but differs from the both by the obovate and shortly acute leaves.

4. *Uncaria* SCHREB.

Uncaria florida VIDAL; MATSUM. et HAYATA Enum. Pl. Formos. p. 182.

HAB. Kōtōshō, Garambi.

DISTRIB. The Philippines.

Uncaria Kawakamii HAYATA (Pl. III) Mater. Fl. Formos. p. 140. Shrub scandent, branches fuscous-rubescens, cylindric-tetragonous, with few hairs; branchlets slender, tetragonous, with a few ferrugineous hairs or nearly glabrous, leaves remotely arranged, internodes 7 cm. long. Leaves opposite, chartaceous, elliptical-ovate or oblong, 6–12 cm. long, 3–5 cm. broad, suddenly acuminate at the apex, (acuminate parts obtuse at the end), truncate-rounded or truncate-acute at the base, nearly entire, primary lateral veins 7 on each side, slender, costa on both surfaces slightly hairy, the rest glabrous, very pallid on the lower surface, petioles 1 cm. long, hairy, stipules interpetiolar, triangular-ovate, 1 cm. long, 2-lobed at the apex, lobes acuminate, glabrous, margin hairy. Heads axillary, solitary, with long peduncles, peduncles (sterile peduncles) hairy, 2 cm. long, articulate with the pedicel and with 4-bracts on the apex, bracts verticillate, two of them broader, 2-fid reflexed, 12 mm. long, 7 mm. broad, lobes ovate-lanceolate, acuminate at the apex, 10 mm. long, 3½ mm. broad, margin ciliate, barbate at the base, the other two narrower linear, 13 mm. long, 1½ mm. broad, simple, margin scarcely ciliate, (barbate at the base), pedicels (flowering peduncles) 1–1½ cm. long, with densely adpressed hairs. Heads globose, 1½ cm. long (corolla excluded), calyx-tube long fusiform-nuculate, 4½ mm. long, pubescent, limb campanulate, 2½ cm. long, deeply 5-lobed, lobes narrow, lanceolate, obtuse, margin and outside pubescent, inside glabrous. Corolla-tube filiform, 1 cm. long, dilated upwards, limb campanulate, 2 mm. long, deeply 5-lobed, lobes oblong-ovate or spatulate-oblong, fleshy, 1½ mm. long, ¾ mm. broad, glabrous, rounded or shortly mucronate at the apex, margin slightly reflexed, carinate on the middle of

the back; anthers affixed on the corolla-throat, ovate-oblong, 1 mm. long, 2-lobed at the base (lobes aristate-acute) sessile or filaments very short. Ovary 2-celled.

HAB. Kōshūn.

The present plant is the nearest to *Uncaria philippinensis* ELMER, but differs from it in having larger heads and longer corolla-tubes. Also near *U. florida* VID., but differs from it in having lanceolate calyx-lobes and longer peduncles of flower-heads.

5. *Thysanospermum* CHAMP.

Thysanospermum diffusum CHAMP.; MATSUM. et HAYATA Enum. Pl. Formos. p. 182; HAYATA Mater. Fl. Formos. p. 142.

HAB. Formosa, in Herb. Taihoku-Museum.

DISTRIB. Kiangsu, Hongkong, Loo-choo islands.

The species is represented in the Museum of Taihoku. It is not yet represented from the island in the Herbarium at Tōkyō.

6. *Wendlandia* BARTL.

Key to the Formosan Species.

- (1) Leaves and inflorescence quite hairless. *W. glabrata*.
 Leaves pubescent, inflorescence tomentose or hirsute. . . . *W. paniculata*.

Wendlandia glabrata DC.; MATSUM. et HAYATA Enum. Pl. Formos. p. 184.

HAB. Kelung, Hokkōkei, Kōtōshō, Kusshaku, Tamsui.

Wendlandia paniculata MATSUM. et HAYATA Enum. Pl. Formos. p. 184.

HAB. Hōzan, Goshōrin, Kōtōshō.

DISTRIB. Eastern India, Malaya.

7. *Dentella* FORST.

Dentella repens FORST.; MATSUM. et HAYATA Enum. Pl. Formos. p. 185.

HAB. Taitō : Hakuhakusha.

DISTRIB. Tropical Asia, the Philippines and Australia.

8. *Hedyotis* LINN.

Dichotomous Key to the Formosan Species.

- (1) Leaves linear, smaller. *H. hispida*.
 Leaves lanceolate, larger. (2).
 (2) Flowers terminal or lateral cyme, cymes long pedunculate.
 *H. nantensis*.
 Flowers in axillary-clusters, clusters sessile..... *H. uncinella*.

Hedyotis hispida RETZ.; MATSUM. et HAYATA Enum. Pl. Formos. p. 185.

HAB. Kelung, Hikaku, Taihoku, Kussaku.

DISTRIB. India and Malaya.

Hedyotis nantensis HAYATA Mater. Fl. Formos. p. 142. Herb, but shrubby towards the base, seemingly scandent or voluble, very green; branches angulate, slightly scabrous or lævigata, internodes 6-7 cm. long. Leaves oblong, oblong-lanceolate, changeable in size, 5-10 cm. long, 2-3½ cm. broad, acute or acuminate at the base, slightly attenuate to the petioles, entire, chartaceous-membranaceous, lateral veins 5-6, basal veins parallel to the margin, the rests diverging upwards with an acute angle, then recurving, impressed on the upper surface, slightly prominent on the lower surface, upper surface very green, lower surface pallid, both surfaces glabrous, but slightly scabrid, petioles 5 mm. long, stipules interpetiolar and membranaceous, aristately-4-dentate, sinus of the teeth truncate. Flowers in paniculate-cymes, cymes terminal or axillary, flowers at the apex of branches of cymes umbellately 10-30-fasciculate; bracts lanceolate, pedicels 2 mm. long. Calyx-tube campanulate, 1½ mm. long, 4-lobed, lobes linear, 2 mm. long, ½ mm. broad, recurved, sinus of the lobes truncate and with appendage, appendages setiformed, ½ mm. long. Corolla campanulate-tubiformed, tube 1½ mm. long, smooth on both sides, limb 4-lobed, lobes angustate, 5½ mm. long, 1 mm. broad, revolute to the midway, obtuse at the apex, 3-nerved, outer

surface smooth, inner surface barbate downwards, glabrous upwards. Stamens 4, filaments exserted, 7 mm. long, filiform, barbate on the inner side at the base, anthers ovate-linear, 2 mm. long, deeply 2-lobed at the base. Ovary inferior, crowned with setuliform erect white densely fasciculate hairs at the apex, 2-celled, ovules many, style 5 mm. long with white-beards on the midway, deeply 2-lobed at the apex, lobes linear complanate hairy 2 mm. long, patent and recurved, grayish brown.

HAB. Nantō; Giōchi.

Near *H. capitellata* WALL. and *H. Elmeri* MERRILL, but differs from the former in having stalked flowers, and from the latter in having narrower leaves, and much narrower calyx-lobes. The flowers of *H. capitellata* are nearly sessile. Our plant appears also to be near *H. macrostemon* H. et A. which I saw in the Herbarium at Hongkong; but, so far as I can judge from the floral characters of the species given in "HOOK. et ARN. Bot. Beech. Voy. p. 192," they are not at all similar, but very distinct.

Hedyotis uncinella HOOK. et ARN.; MATSUM. et HAYATA l.c. p. 185.

HAB. Taiton, Mankinshō, Garambi.

DISTRIB. In the hilly regions of Eastern India.

9. *Oldenlandia* LINN.

Dichotomous Key to the Formosan Species.

Leaves linear, flower axillary, solitary..... *O. corymbosa*.

Leaves oblanceolate or oblong, flowers in terminal panicles. .. *O. paniculata*.

Oldenlandia corymbosa LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 186.

HAB. Taihoku, Goshōrin, Biōritsu, Takow, Mankinshō.

DISTRIB. China; generally in Tropical Asia, Africa and America.

Oldenlandia paniculata LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 186.

HAB. Senton, Taiton, Takow, Garambi.

DISTRIB. China, Japan through India and Malaya, and Polynesia.

10. *Ophiorrhiza* LINN.

Sir J. D. HOOKER remarks, in his "Fl. Brit. Ind. III. p. 77," that the characters taken from the position of the stamens on the corolla-tube, the hairiness within of the latter, the length and smoothness or hairiness of the style, and the form of the stigma are probably sexual to a very great degree. In the course of my study in the fields, I have found that HOOKER's opinion is quite correct. When I was collecting in the Arisan ranges, last spring, I found two different forms of flowers on two very similar plants. This divergence of flowers may be attributed partly, in some cases, to the sexual, and partly, in the other, to the specific difference.

Dichotomous Key to the Species.

- (1) Bracteoles 0, flowers very much smaller, less than 5 mm. in length. (2)
 Bracteoles conspicuous or small, flowers larger, longer than 1½ cm. (3)
- (2) Plants longer, nearly 50 cm. long, leaves larger 12 cm. long.
 *O. parviflora* and *linkiensis*.
 Plants smaller at most 20 cm. in height, leaves smaller 5 cm. long.
 *O. inflata* and *pumila*.
- (3) Stigma-lobes linear. (4).
 Stigma-lobes rounded. (6).
- (4) Leaves oblong, lanceolate, usually abruptly acuminate towards the apex,
 attenuate at the base. (5).
 Leaves ovate, obtuse or acute at the apex, rounded or abruptly acute
 at the base. *O. japonica* form. *longistigma*.
- (5) Leaves pale glaucous beneath in dried specimens... *O. dimorphantha*
 form. *longistigma*.
 Leaves dark greenish above, reddish purple beneath, in dried specimens.
 *O. monticola*, form. *longistigma*.
- (6) Leaves oblong or lanceolate. (7).
 Leaves linear-lanceolate. *O. stenophylla*.
- (7) Leaves quite glabrous or very thinly pubescent. (8).

Leaves scabrous, thinly hairy, oblong or lanceolate, acuminate on both sides, reddish beneath in a dried specimens... *O. monticola*,

form. *brevistigma*.

(8) *a*) Leaves elongate, lanceolate, 10 cm. long. (9).

b) Leaves shorter, abruptly acuminate on both ends. *O. dimorphantha*
form. *brevistigma*.

c) Leaves shorter, obtuse at both ends. *O. japonica*.
form. *brevistigma*.

(9) Leaves lanceolate, calyx-lobes obtuse. *O. Tashiroi*.

Leaves oblong, broader than the preceding, calyx-lobes acute.

..... *O. acutiloba*.

Ophiorrhiza acutiloba HAYATA sp. nov. Caulis validiusculus, atrombescens, lenticellis oblongis dense obtectus, subglaber, a basi pauci-ramosus vel eramosus, basi scandens, superne erectus, partibus erectis 40 cm. longis, foliosis, subtetragonis. Folia opposita, oblonga, elliptica, maxima 12 cm. longa 4 cm. lata apice brevissime acuminata, basi acuta membranacea, utraque pagine glabra, supra exsiccato fuscentia, subtus pallidissima vel rubescentia, petiolis 2–3 cm. longis, stipulis latissimis brevissimis ciliolatis incrassatis. Cymæ terminales, pedunculis 4 cm. longis, bracteolis linearibus, 6–8 mm. longis 1 mm. latis. Calycis tubus 1–1½ mm. longus 2½ mm. latus pubescens, lobis oblongo-triangularibus 1½ mm. longis tubo longioribus basi 1 mm. latis. Corolla 1½ cm. longa extus glabra, intus basi glabra, ad faucem dense albo-barbata, limbo intus tuberculato-hirsuto, lobis oblongo-triangularibus 4 mm. longis intus tuberculato-hirtellatis, disco 2-partito, stylo 11 mm. longo, a medio sursum hirsuto, stigmatibus 2-lobatis, lobis ovatis obtusis. Fructus latissimi, 5 mm. longi, apice discis accrescentibus latissimis coronati, a latere subalati, facie 5-costati, calycis lobis persistentibus, lobis 1½ mm. longis 2 mm. a basi latis.

HAB. Okinawa, leg. Y. Tashiro, Aprili, 1887.

Near *O. Tashiroi*, but differs in having acute lobes of the corolla.

Ophiorrhiza dimorphantha HAYATA sp. nov. form. **longistigma**

Caulis inferiore procumbens, superiore erectus, teragono-teres, pubescens,

Folia oblonga apice acuminata ad extremitatem obtusa, basi subito attenuata, ad petiolum abeuntia, circ. 5 cm. longa, subtus brevissime et paucissime pubescentia, supra fuscentia subtus pallidiora, stipulis interpetiolaribus latissimis brevissimis obscuris. Cymæ terminales paucifloratæ, bracteolis 4 mm. longis linearibus hirsutis, pedicellis 3 mm. longis. Flores 2 cm. longi, extus brevissime pubescentes, calycis tubo brevissimo plus minus costato $1\frac{1}{2}$ mm. longo 3 mm. lato plus minus urceolato, dentibus 5 triangularibus. Corolla 18 mm. longa, extus paucissime hirsuta, intus hirsuta, lobis oblongis intus hirtellis. Stamina ad medium tubi affixa, filamentorum partibus liberis brevissimis. Discus bipartitus. Stylus 8 mm. longus, inclusus hirtellatus, apice 2-lobus, lobis linearibus 3 mm. longis.

HAB. Daitonzan, leg. S. NAGASAWA, 1903.

form. **brevistigma** caulis subteres, basi procumbens, gracilis, 25 cm. longus, tetragonus, sulcatus, exsiccato nigricans, pauci-ramosus vel eramosus, subglaber, sed ad nodos leviter pulveraceo-pubescent remote foliatus. Folia opposita, longe vel breve petiolata, oblonga vel oblongo-lanceolata, utrinque abrupte attenuata vel apice cuspidato-acuta, ad extremitatem obtusa, basi abrupte attenuata, ad petiolum 2 cm. longum abeuntia, membranacea, integra, supra paucissime pubescentia vel glabra, subtus glaberrima, exsiccato supra fuscentia, subtus pallidissima, stipulis crassis, brevissimis, minute dentatis. Cymæ terminales longe vel breve pedunculatæ, paucæ pulveraceæ, bracteolis linearibus, 10-3 mm. longis, pedicellis 5-3 mm. longis. Flores elongati, 17 mm. longi, calycis tubis $1\frac{1}{2}$ mm. longis, turbinatis, puberulis, plus minus carinatis, lobis minutis, dentiformibus, acutis, triangularibus, $\frac{1}{2}$ mm. longis totiusque latis. Corolla 16 mm. longa tubuliformia, apice ampliata, lobis dorso carinato-alatis, tubis intus basi usque ad medium glabris supra medium albo-barbatis, limbis intus cristato-tuberculatis, lobis triangularibus oblongis. Stamina tubo infra medium inserta, filamentorum partibus liberis brevibus 1 mm. longis glabris, antheris linearibus 3 mm. longis apice obtusis basi 2-lobatis. Discus cylindricus ad basin styli, 2-partitus, 1 mm. longus vel longior. Stylus filiformis 11 mm. longus, hirsutus, stigma 2-lobatum, lobis oblongis 1 mm. longis. Ovarium 2-loculare, ovulis numerosis. Fructus late obtriangularis complanatus, 6 mm.

latus, $2\frac{1}{2}$ mm. longus, apice truncatus vel in centro late emarginatus, disco 2-partito (partibus apice emarginatis) coronatus, versus basin acutus, subito ad pedicellum abeuns, latere et facie costatus, (calycis lobis acutis persistentibus), pulveraceo-pubescens. Semina scobiformia quadrangulària complanata, testa rubra $\frac{1}{2}$ mm. longa.

HAB. Taitō: Bunshiseki, leg. T. KAWAKAMI, et U. MORI, (No. 218 A), Dec., 1908.

Ophiorrhiza japonica BLUME? form. **brevistigma**. The plant recorded under this name from Formosa and Liu-Kiu is not identical with the named species: for the plant from Liu-Kiu has very acute or subulate persistent calyx-lobes on the fruit, and that from Formosa is somewhat different from the Japanese plant by the much longer leaves and in having corolla which is nearly glabrous inside. The following description is drawn up from a Japanese specimen which is labelled as *O. japonica* BLUME in the Herbarium at Tōkyō.

Ophiorrhiza japonica BLUME form. **longistigma**. Caulis inferiore repens, prostratus, superiore erectus, partibus erectis 5-10 cm. longis, brevissime pubescentibus. Folia longe petiolata, opposita, oblonga, ovata, 2-5 cm. longa, 1 cm.- $2\frac{1}{2}$ cm. lata, apice obtusa, basi rotundata, abrupte acuta ad petiolum abeuntia, supra scabra brevissime hirsuta, subtus ad nervos hirsuta, rubescentia, petiolis $1-2\frac{1}{2}$ cm. longis, stipulis interpetiolaribus 3-4-dentiformibus, dentibus crassis brevissimis. Cymæ contractæ, paucifloræ, terminales, pedunculis $1\frac{1}{2}$ cm. longis, bracteolis filiformi-linearibus 3 mm. longis, pedicellis 1-3 mm. longis. Florum alabastrum 8 mm. longum, calycis tubus rotundatus, pubescens plus minus sulcatus, limbo 5-lobato, lobis oblongo-triangularibus glabris obtusis. Corolla extus glabra in alabastro clavata apice dorso lorum prominente carinata vel alata intus glabra ad faucem non barbata, limbo intus cristato brevissime hirtellato. Stamina prope medium tubi inserta, disco bi-partito. Stylus a medio sursum bifidus, lobis linearibus $2\frac{1}{2}$ mm. longis.

HAB. Mt. Amagi, Izu.

This is a much smaller form, with corolla not hairy on the throat and 2-lobed linear stigma.

Ophiorrhiza liu-kiuensis HAYATA sp. nov. Caulis tereto-tetragonus, brevissime pubescens. Folia opposita longe petiolata, oblongo-ovata, 15 cm. longa 5 cm. lata, apice acuta ad extremitatem obtusa, basi cuneato-attenuata, membranacea, supra sensim scabra, subtus ad nervum pilosa, subtus rubescentia vel pallida, margine integra, (primum ciliolata) stipulis interpetiolaribus 2-partitis, segmentis cuspidatis, 3 mm. longis, breve pubescentibus, petiolis 3 cm. longis. Cymæ terminales, pedunculis 5 cm. longis, floribus ad ramum cymarum cincinnis secundis. Flores 5 mm. longi, tubo calycis 1-1½ mm. longo, ureolato, limbo 5-dentato, dentibus triangularibus dorso carinatis. Corolla 4½ mm. longa, extus brevissime pubescens, tubo intus basi glabro ad faucem longe albo-barbato, lobis 5 ovato-triangularibus intus minute tuberculatis. Stamina 5, prope basin corollæ affixa, filamentorum partibus liberis 1½ mm. longis, antheris oblongis 1¼ mm. longis utrinque emarginatis. Stylus 3½ mm. longus, stigma 2-lobatum, lobis rotundatis complanatis. Fructus latissimus, 9 mm. latus 3-3½ mm. longus, a latere carinatus, et a facie 5-carinatus, basi obtusissimus apice truncatus, vel emarginatus, apice discis latissimis persistentibus coronatus, brevissime pubescens. Semina scobiformia angulata, ad angulos valde carinata, facie concava, minute reticulata.

HAB. Liu-kiu, leg. NAKAGAWA, (No. 172), et S. TANAKA, (No. 403).

Near *O. parviflora* HAYATA, but differs from that in having somewhat hairy leaves.

Ophiorrhiza monticola HAYATA form. **brevistigma**. Caulis basi procumbens, superne erectus, gracilis, partibus erectis 25 cm. longis, pubescentibus, tetragonis, atro-rubrescentibus, remote foliatis, pubescentibus. Folia longe petiolata, oblongo-lanceolata, utrinque acuminata, 7 cm. longa 2 cm. lata, supra fuscentia scabrida brevissime pilosa, subtus rubescentia, subglabrata, petiolis 1½ cm. longis, stipulis brevissimis truncatis ciliolatis. Cymæ terminales, pedunculis 3 cm. longis, ramis cymæ rubo-pubescentibus, bracteolis linearibus 4 mm. longis pubescentibus. Calycis tubus 1 mm. longus, 2 mm. latus, non carinatus, extus brevissime pubescens, lobis dentiformibus, dentibus ⅔ mm. longis. Corollæ alabastrum apice clavatum, lobis a dorso prominente carinatum, vel alatum, extus parce et brevissime hirsutum. Corolla apertiens 1 cm. longa, intus basi glabra, ad faucem albo-

dense-barbata, lobis intus cristato-tuberculatis. Stamina medio tubi affixa, antheris linearibus $2\frac{1}{2}$ mm. longis, apice rotundatis, basi 2-lobatis. Discus 2-partitus, $1\frac{1}{2}$ mm. altus. Stylus 11 mm. longus, hirsutus, stigma crassum, 2-lobatum, lobis rotundatis crassis.

HAB. Suisha, Nantō, leg. G. NAKAHARA, Feb., 1907.

Form. **longistigma**. Caulis basi procumbens superiore erectus, partibus erectis 30 cm. longis, atro-rubrescentibus, subtetragonis, pauci-romosis, ramis rubro-pubescentibus gracilibus. Folia oblonga lanceolata, vel obovato-lanceolata apice cuspidato-acuminata, basi cuneato-attenuata, ad petiolum $1\frac{1}{2}$ cm. longum attenuata, 6–5 cm. longa $1\frac{1}{2}$ –2 cm. lata, subintegra, supra fuscentia subglabra, infra rubro-purpurascens subglabra, stipulis interpetiolaribus latissimis ciliolatis 4-dentiformibus crassis. Cymæ terminales, pedunculis 1 cm. longis, pedicellis brevibus, bracteolis 4 mm. longis lineari-filiformibus. Floris alabastrum 13 mm. longum. Calycis tubus 1 mm. longus, ecostatus, lobis triangularibus $\frac{2}{3}$ mm. longis acutis. Corollæ alabastrum apice clavatum dorso loborum prominente carinatum vel alatum, extus glabrum, intus basi glabrum, medio hirsutum ad faucem et lobum cristato-hirtellatum. Stamina supra medium tubi corollæ affixa, filamentorum partibus liberis 2 mm. longis glabris. Discus 2-partitus, 1 mm. longus, segmentis emarginatis. Stylus $4\frac{1}{2}$ mm. longus, ad medium sursum 2-partitus, lobis dilatatis $2\frac{1}{2}$ mm. longis $\frac{2}{3}$ mm. latis lanceolatis obtusis complanatis.

HAB. Mt. Tōzan, Mt. Morrison, leg. G. NAKAHARA, Oct. 1906.

Ophiorrhiza parviflora HAYATA sp. nov. Caulis eramosus erectus 60 cm. longus basi 5 mm. in diametro, terete-tetragonus, remote foliatus, internodiis 10–15 cm. longis, subglaber, superne breve pubescens. Folia opposita petiolata, oblongo-ovata, apice obtuse acuta, basi acuto-attenuata, 10–12 cm. longa 5–6 cm. lata, membranacea, subglabra, subtus pallidissima, petiolis 2–3 cm. longis, stipulis interpetiolaribus 2–3 mm. longis basi triangularibus, apice bicuspidatis vel 1-setosis pubescentibus. Cymæ ad apicem caulis vel ramorum terminales, longe pedunculatæ, cum pedunculis 5–6 cm. longæ, pedunculis 4 cm. longis, ramis cymæ patentibus pubescentibus, floribus subsecundis, bracteolis 0, pedicellis brevissimis 2 mm. longis, vel floris sessilibus. Flores parvi $4\frac{1}{2}$

mm. longi. Calycis tubus globoso-suburceolatus, 1 mm. longus vel longior brevissime pubescens sub-sulcatus, lobis late triangularibus $\frac{1}{2}$ – $\frac{1}{3}$ mm. longis, $\frac{1}{2}$ mm. basi latis, obtusis. Corolla tubuloso-campanulata, $3\frac{1}{2}$ mm. longa, extus brevissime pubescens, tubo intus basi glabrato, ad faucem longe hirsuto vel piloso, (pilis longis albis), apice 5-lobata lobis triangularibus, intus tuberculatis. Stamina 5, supra basin colloræ affixa, filamentis brevibus $\frac{1}{2}$ mm. longis, antheris oblongo-linearibus 1 mm. longis vel longioribus utrinque 2-lobatis. Discus 2-partitus, $\frac{1}{3}$ mm. longus. Stylus $2\frac{1}{2}$ mm. longus parce hirsutus vel glaber apice 2-lobus, lobis $\frac{1}{2}$ mm. longis, rotundatis. Fructus latissimi $5\frac{1}{2}$ mm. lati 3 mm. longi basi obtusi apice late emarginati, facie striati, striis elevatis, discis accrescentibus 4 mm. latis coronati. Semina scobiformia, $\frac{1}{3}$ mm. longa angulata facie concava minute reticulata.

HAB. Kōtōshō: Imorod-mura, leg. K. MIYAKE, 1899.

Near *A. Mungos* LINN., but differs by the calyx-lobes which are not keeled on the back.

***Ophiorrhiza pumila* CHAMP.?**

HAB. Taiko (No. 55), Keelung, MAKINO, 1896; closely related to *O. inflata* MAXIM.

Specimens mentioned under *O. pumila* CHAMP. in my "Fl. Mont. Formos. p. 112" are not the same as the named species. After close examination, I have found that only one of the specimens numbered 55 is doubtfully referable to *O. pumila* CHAMP. As the specimen is very imperfect, however, the exact identification is not possible.

***Ophiorrhiza stenophylla* HAYATA sp. nov.** Caulis erectus 50 cm. longus, subtetragonus vel subteres, paucissime pubescens, remote foliatus. Folia lineari-lanceolata vel linearia, apice longe attenuato-acuminata, basi attenuata, maxima 15 cm. longa 13 mm. lata, supra subglabrata, fusco-viridescens, subtus glabrata pallidissima, petiolis $\frac{1}{2}$ –1 cm. longis, stipulis minutis triangularibus ad apicem callosis. Cymæ axillares vel terminales, multi-floræ, pedunculis 4 cm. longis, bracteolis linearibus. Calycis tubus suburceolatus, elevato-tuberculatus (vel-tuberculato-botryoidalis) plus minus costatus, 2 mm. longus, lobis oblongo-lanceolatis obtusis $1\frac{1}{2}$ mm. longis dorso plus minus

crassis. Corolla 14 mm. longa, extus glabra, tubo 10 mm. longo, intus glabro, lobis triangularibus 2 mm. longis intus minute tuberculatis. Stamina infra faucem tubi affixa, filamentorum partibus liberis 2 mm. longis, antheris oblongis 1 mm. longis. Discus leviter 2-lobatus, 1 mm. longus. Stylus 1 cm. longus glaber, stigma 2-lobatum, lobis rotundatis.

HAB. Inter Urai et Laga, leg. K. MIYAKE, 1899.

I saw the plant at the same localities in my last excursion to Formosa. It exists in the northern, but not in the southern parts of the island.

Ophiorrhiza Tashiroi MAXIM. ? Caulis subtetragonus, 30—40 cm. longus, glaber vel breve pubescens. Folia lanceolata, utrinque attenuata, 13 cm. longa, 2½ cm. lata, remota, membranacea, supra fuscentia, subtus pallidiora vel pallidissima, petiolis 3–1 cm. longis. Flores cymosi, cymis terminalibus pedunculatis, bracteolis lineari-filiformibus, circ. 1 cm. longis, calycis lobis acutis. Corolla 1½ cm. longa, stylo 13 mm. longo hirsuto.

HAB. inter Suiteiryō et Niki, leg. C. OWATARI, 1898.

The plant was formerly referred to *O. pumila* by Prof. J. MATSUMURA, but differs from that species by the much shorter corolla. It comes quite near *O. Tashiroi* MAXIM. from which this differs by only the leaves which are very pale on the under side. The leaves of *O. Tashiroi* are reddish purple on the under surface in a dried specimen.

11. *Mussaenda* LINN.

Dichotomous Key to the Formosan Species.

Leaves oblong 7 cm. long 3½ cm. broad acuminate at both ends. Floral leaves white oblong or orbicular apiculate at the apex, nearly 3 cm. long. *M. parviflora*.

Leaves much larger, oblong or oblongo-ovate, 20–24 cm. long, 8–10 cm. broad cuspidate-acuminate at the apex, cuneately acute at the base, floral leaves 1 or 2, large, white, ovately cordate, 11 cm. long, 7½ cm. broad, cuspidately acute at the apex, roundly cordate at the base. . . . *M. kotoensis*.

Mussaenda pubescens AIT. mentioned in HENRY's list and "MATSUM. et HAYATA Enum. Pl. Formos." is not yet represented in the Government collections.

Mussænda kotœnsis HAYATA (Pl. IV.) Mater. Fl. Formos. p. 143.

Mussænda macrophylla MATSUM. in Tōkyō Bot. Mag. XIV. p. 147 ;
MATSUM. et HAYATA Emm. Pl. Formos. p. 188, (non WALL).

Shrubby herb, branches terete, slightly angulate, with pith in the center, lenticels oblong, a few barbate on the nodes, otherwise glabrous. Leaves somewhat larger, membranaceous or thinly chartaceo-membranaceous, oblong or obovate-oblong, 20-24 cm. long 8-10 cm. broad, cuspidate-acuminate at the apex, cuneate-acute at the base, slightly hairy on the costa and veins on both surfaces, otherwise glabrous, lateral veins 9-10 on each side, basal lateral veins diverging with an acute angle and parallel to the margin, medial lateral veins erect-ascending with an angle 40° from the costa, arcuate upwards, very pale on the lower surface, petioles 5 cm. long, stipules interpetiolar very broad, 12 mm. broad 8 mm. long, barbate on the outside at the insertion, smooth but setose on the inside, (seta finger-like, many,) 2-fid at the apex, lobes divergent, margin ciliate and reflexed. Cymes terminal, 10 cm. long as broad ; floral leaves 1 or 2 somewhat larger, whitish membranaceous, ovate-cordate, 11 cm. long, $7\frac{1}{2}$ cm. broad, cuspidate-acute at the apex, rounded-cordate at the base or rounded-acute, shortly attenuate at the very base, margin ciliate, scarcely hairy on the costa and veins on both surfaces, otherwise smooth, distinctly 5-nerved, nerves divergent with an acute angle, bracts palmately trilobed, densely hairy outside, scarcely hairy inside, densely hairy on the insertion, central lobe narrowly acute at the apex, larger, 8 mm. long, 2 mm. broad, lateral lobes ovate-acute shorter. Calyx densely hairy cylindrical-obconical, 5 mm. long, lobes triangulari-lanceolate, 8 mm. long, 3 mm. broad, acuminate, densely hairy on the outside, scarcely pubescens on the inside. Corolla-buds cylindrical, slightly dilatate and acute at the apex, 5-costate densely hairy on the outside, (hairs 2 mm. long), tube 23 mm. long, inside very densely villosely barbate, glabrous near the base. Limbs of the corolla patent, 5-fid, lobes ovate, 5 mm. long, cuspidate-acute at the apex, hairy outside, glabrous inside, grayish rubescent in a dried specimen. Stamens inserted on or near the base of the corolla, filaments short, $1\frac{1}{2}$ mm. long, anthers linear $5\frac{1}{2}$ mm. long, connectives slightly produced, obtuse at the apex, with an appendage at the apex of the cells, appendages obtuse. Style short, 3 mm. long, 4-5-fid at the apex. Disk annular.

HAB. Kōtōshō.

Near *M. macrophylla* WALL., but differs from it in having smaller bracts, much larger floral leaves, and smaller calyx-lobes.

Mussænda parviflora MATSUM. et HAYATA Enum. Pl. Formos. p. 188.

HAB. Kelung, Hōzan, Reigaryō, Pachina, Tōseikaku, Suisha, Shūshū-gai, Taitō, Taichū, Tamsui, Kōshūn.

DISTRIB. Loo-choo islands.

Mussænda pubescens AIT.; MATSUM. et HAYATA Enum. Pl. Formos. p. 188.

HAB. Southern and western parts of Formosa, (after HENRY).

DISTRIB. Central and Southern China.

13. *Randia* LINN.

Key to the Formosan Species.

- (1) Calyx-limb 5-fid or parted, teeth elongate, shrub with spines. (2)
Calyx shortly 5-dentate, unarmed shrubs. (3).
- (2) Corolla-tube broad, shorter than the limb, calyx-lobes laciniate, ovate.
.....*R. dumetorum*.
Corolla-tube slender, longer than the limb, calyx-lobes laciniate subulate.
.....*R. sinensis*.
- (3) Flower-clusters few-flowered, pedicels elongate.*R. canthioides*.
Trichotomous cymes, pedicels very short.*R. densiflora*.

Randia densiflora BENTH.; MATSUM. et HAYATA Enum. Pl. Formos. p. 190.

HAB. Kelung.

DISTRIB. Eastern India, Malay peninsula, to Southern Australia.

Randia dumetorum LAM.; MATSUM. et HAYATA Enum. Pl. Formos. p. 190.

HAB. Shifun, Hōkkōkei, Tamsui, Maruyama, Taihoku.

DISTRIB. India, Malaya, Tropical and Eastern Africa.

Randia sinensis ROEM. et SCH.; MATSUM. et HAYATA Enum. Pl. Formos. p. 191.

HAB. Garambi, Akō.

DISTRIB. Hongkong, Kwangtung.

14. *Gardenia* LINN.

Gardenia florida LINN. ; MATSUM. et HAYATA Enum. Pl. Formos. p. 191.

HAB. Kelung, Shintiku, Maruyama, Taihoku, Tamsui.

DISTRIB. Japan, Bonin island, Central and Southern China.

15. *Diplospora* DC.

Diplospora viridiflora DC. ; MATSUM. et HAYATA Enum. Pl. Formos.
p. 192.

HAB. Kelung, Hokkōkei, Horisha, Akō.

DISTRIB. Kwangtung, Hongkong.

16. *Guettarda* LINN.

Guettarda speciosa LINN. ; HOOK. f. Fl. Brit. Ind. III. p. 126 ; WIGHT
Ic. Pl. Ind. Or. t. 40 ; FORBES et HEMSL. Ind. Fl. Sin. I. p. 334 ; HAYATA
Mater. Fl. Formos. p. 145.

HAB. Pratas.

DISTRIB. Common on the shores of the Tropics.

17. *Chomelia* LINN.

Chomelia corymbosa K. SCHM. ; MATSUM. et HAYATA, l.c. p. 189.

HAB. Kōtōshō, Garambi.

DISTRIB. India, Hongkong.

18. *Knoxia* LINN.

Knoxia corymbosa WILLD. ; MATSUM. et HAYATA Enum. Pl. Formos.
p. 189.

HAB. Gōzengio.

DISTRIB. India, Malaya, China and Australia.

19. *Ixora* LINN.

Ixora chinensis LAM. ; MATSUM. et HAYATA Enum. Pl. Formos. p. 192.

HAB. Kelung, Taichū, Kashinro, Biōritsu, Tainan.

DISTRIB. Malay peninsula and archipelago.

20. *Pavetta* LINN.

Pavetta indica LINN. ; MATSUM. et HAYATA Enum. Pl. Formos. p. 193.

HAB. Kōtōshō.

DISTRIB. India, Malaya, Northern Australia.

21. *Morinda* LINN.*Key to the Formosan Species.*

Leaves elongately oblong, acute at the base, acute or shortly acuminate at the apex, 10 cm. long, $3\frac{1}{2}$ cm. broad, obtuse at the very extremity. Flowers in terminal compound umbels, umbels sessile, umbellules pedicelled, pedicels or radii 2 cm. long, umbellules 5-10-flowered, flowers sessile.

Fruits syncarp, depressingly globose, $\frac{3}{4}$ cm. in diameter. *M. umbellata*.

Leaves ovate or broadly ovate, 20 cm. long, 10 cm. broad, obtuse at both ends.

Branches very strong. Syncarp depressingly globose 4 cm. in diameter.

. *M. citrifolia*.

Morinda citrifolia LINN. ; MATSUM. et HAYATA Enum. Pl. Formos. p. 193.

HAB. Kōtōshō, Kōshūin.

DISTRIB. Tropical Asia, Eastern Africa, Northern Australia.

Morinda umbellata LINN. ; MATSUM. et HAYATA Enum. Pl. Formos. p. 194.

HAB. Kussaku, Kelung.

DISTRIB. Widely diffused in Tropical Asia, Japan to Northern Australia.

22. *Damnacanthus*.*Dichotomous Key to the Formosan Damnacanthus.*

- (1) Leaves ovate, smaller 2-3 cm. long, spiny.....*D. indicus*.
 Leaves lanceolate, linear nearly 10 cm. long, less spiny or not at all
 spiny.....*D. angustifolia*.

Damnacanthus angustifolius HAYATA Fl. Mont Formos. p. 113. t.
 XV.

HAB. Arisan.

Damnacanthus indicus GÆRTN.; HAYATA Fl. Mont. Formos. p. 114.

HAB. Arisan, Mt. Morrison, Hinokiyama.

DISTRIB. Eastern India, Central China, the Loo-choo islands and Japan.

23. *Psychotria* LINN.*Key to the Formosan Species.*

- Erect, leaves elliptical or lanceolate, 14 cm. long, 4 cm. broad, acute at
 the apex, attenuate at the base.*P. elliptica*.
 Repent on the ground or on a trunk, branches much divaricate, leaves much
 smaller, obovate or oblong, 4 cm. long 1½ cm. broad.*P. serpens*.

Psychotria elliptica KER.; MATSUM. et HAYATA Enum. Pl. Formos.
 p. 194.

HAB. Pachina, Hokkōkei, Giran, Tonsonpi, Taitō, Senton, Kelung,
 Kussaku.

DISTRIB. Kwangtung, Hongkong, Hainan.

Psychotria serpens LINN.; MATSUM. et HAYATA Enum. Pl. Formos.
 p. 195.

HAB. Maruyama, Hokkōkei, Kōtōshō, Pachina, Taiton, Kelung.

DISTRIB. Central and Southern China and Corea.

24. *Geophila* DON.

Geophila reniformis DON.; MATSUM. et HAYATA Enum. Pl. Formos.
 p. 195.

HAB. Akō, Chūrei, Hieranzan.

DISTRIB. Tropical Asia, Africa, America, Australia and Polynesia.

25. *Lasianthus* JACK.

Dichotomous Key to the Formosan Species.

- (1) Bracts conspicuous more than 1 cm. in length. (2).
 Bracts inconspicuous minute or nearly none. (3).
- (2) Leaves nearly glabrous above, hirsute beneath, elliptical, cordate at the base, acuminate at the apex, bracts subulate or linear, ciliate, branches yellowish-hirsute. *L. Wallichii*.
 Leaves much larger, reddish hirsute on both surfaces, elongately oblong, acute at the base, acuminate at the apex, bracts broader, oblong, acuminate, hairy, branches nearly glabrous or hirsute with reddish hairs. *L. cyanocarpus*.
- (3) Branches nearly glabrous, calyx nearly glabrous or very slightly hairy. (4).
 Branches hairy, calyx hirsute with rigid hairs. (5).
- (4) Corolla large nearly 1 cm. in length. *L. chinensis*.
 Corolla smaller, 3-4 mm. in length. *L. Tashiroi*.
- (5) Branches nearly hirsute. *L. formosensis*.
 Branches tomentose. *L. formosensis* var. *hirsutus*.

Species imperfectly known to me.

Lasianthus japonicus MIQ.; given in HENRY List. Pl. Formos. p. 50 and also in MATSUM. et HAYATA Enum. Pl. Formos. p. 197, is not yet represented in the Governmental collections.

***Lasianthus chinensis* BENTH.;** MATSUM. et HAYATA Enum. Pl. Formos. p. 195.

HAB. Pachina, Kelung, Tensonpi, Botansha, Maruyama, Kussaku, Kōkō.

DISTRIB. Eastern India, Malaya.

***Lasianthus cyanocarpus* JACQ.;** MATSUM. et HAYATA, l.c. p. 196.

HAB. Kelung.

DISTRIB. Eastern India, Malaya and Hongkong.

Lasianthus formosensis MATSUM. et HAYATA Enum. Pl. Formos. p. 196, t. XV. A.

HAB. Rahao, Kussaku.

Var. **hirsuta** MATSUM. et HAYATA Enum. Pl. Formos. p. 197.

HAB. Nankō, Shifun.

Lasianthus Tashiroi MATSUM.; MATSUM. et HAYATA Enum. Pl. Formos. p. 197.

HAB. Kōtōshō.

Lasianthus Wallichii WIGHT; MATSUM. et HAYATA Enum. Pl. Formos. p. 197.

HAB. Kelung, Urai, Hokkōkei, Tamsui.

DISTRIB. Eastern India, Malaya.

26. *Pæderia* LINN.

Pæderia tomentosa BLUME; MATSUM. et HAYATA Enum. Pl. Formos. p. 197.

HAB. Pachina, Kelung, Tamsui, Shintiku, Shifun; common all over the island.

DISTRIB. From China and Japan to Himalaya and Malaya.

Form. **tenuissima** HAYATA Mater. Fl. Formos. p. 145.

HAB. Randaizan.

OBSERV. An extremely delicate form of *P. tomentosa*.

27. *Serissa* COMM.

Serissa foetida COMM.; MATSUM. et HAYATA Enum. Pl. Formos. p. 198.

HAB. Shintiku, Tamsui.

DISTRIB. Japan, Central and Southern China.

28. *Nertera* BANKS et SOL.

Nertera nigricarpa HAYATA Fl. Mont. Formos. p. 115; HAYATA Mater. Fl. Formos. p. 145.

This is very near *N. depressa* BANKS; but differs from it in having black coloured berries, and in the leaves which are quite obtuse or even rounded at the apex, and slightly cordate at the base. *N. depressa* has yellow coloured fruits, and the leaves are more or less acute at the apex and much more cordate at the base.

29. *Coprosma* FORST.

Coprosma Kawakamii HAYATA Mater. Fl. Formos. p. 145. Branches strong, tetragonous, longitudinally rugose, gray or nigricant, branchlets strong, divaricate, dark gray, slender, tetragonous, 2-3 cm. long, $1\frac{1}{2}$ mm. in diameter, pulvinus approximately cruciately arranged $1\frac{1}{2}$ mm. long, $\frac{2}{3}$ mm. broad, articulate with petioles. Leaf-buds pyramidal, tetragonous, perulas oblong-triangular, 2 mm. long, $1\frac{1}{3}$ mm. broad, acute at the apex, carinate on the back, persistent. Leaves opposite, cruciately arranged towards the apex of branches, obovate, obspathulate or obovate-oblong, thick, 1 cm. long, 5 mm. broad, obtusely acute or rounded or cuneate-rounded at the apex, acute or cuneate-acute at the base, both surfaces glabrous, costa and veins impressed, veinlets reticulate and impressed on the upper surface, costa prominent on the lower surface, veins and veinlets slightly prominent on the lower surface, rubescent, lower surface albescent, with a small reddish membrane at the ramification of veins, margin entire and slightly reflexed on the lower surface, petioles $1\frac{1}{2}$ -2 mm. long, concave on the inside and convex on the outside, base articulated with pulvinus. Flowers on the axiles of upper leaves long pedunculate, peduncles solitary, 7 mm. long, glabrous, with 4-bracts at the apex, 2 of them somewhat larger, narrow, 3 mm. long, 1 mm. broad, carinate on the back, the other two smaller quadrangular 1 mm. long, $\frac{2}{3}$ mm. broad, truncate at the apex, margin with long cilia; flowers two on the apex of a peduncle, sessile. Calyx-limb cupuliformed, irregularly dentate, margin scarcely ciliate, disk annular.

HAB. Mt. Morrison.

Near *Coprosma myrtillofolia* Hook. f. and also *C. parviflora* Hook. f., but differs from both in having obovate leaves and long stalked fruits.

30. *Spermacoce* LINN.*Key to the Formosan Species.*

- (1) Flowers and fruits about 2 mm. long, in very dense whorl-like clusters or heads. *S. stricta*.
 Flowers and fruits about 5 mm. long, axillary, but not numerous; plant hispid. *S. hispida*.

***Spermacoce hispida* LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 199.**

HAB. Shintiku, Biōritsu, Takow.

DISTRIB. Widely diffused in India and Malaya.

***Spermacoce stricta* LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 199.**

HAB. Mankinshō.

DISTRIB. Asia and Tropical Africa.

31. *Rubia* LINN.*Dichotomous Key to the Formosan Species.*

- (1) Leaves lanceolate or linear. *R. cordifolia* var. *stenophylla*,
 Leaves rounded, cordate at the base. *R. cordifolia*.

***Rubia cordifolia* LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 199.**

HAB. Shintiku.

DISTRIB. From Dahuria to Japan, China, India, Malaya and Ceylon.

***Rubia cordifolia* LINN. var. *stenophylla* FRANCH.; HAYATA Mater. Fl. Formos. p. 147.**

Rubia lanceolata HAYATA Fl. Mont. Formos. p. 117.

When I was at Kew, I compared my species with FRANCHET's variety and found that they are quite identical. The variety is very like the type.

32. *Galium* LINN.*Dichotomous Key to the Formosan Species.*

- (1) Fruits mucronate, without hooked hairs. *G. gracile*.
 Fruits beset with hooked hairs. (2).
 (2) Stem slightly hairy or glabrous. (3).
 Stem hairy, hairs spreading. *G. rotundifolium*.
 (3) Stem slightly hairy, hairs retrorted, leaves with short retrorted or spreading hairs. *G. Aparine*.
 Stem quite hairless, leaves with ascending hairs. *G. echinocarpum*.

***Galium Aparine* LINN.**

HAB.

DISTRIB. China; generally spread in the Northern Hemisphere.

***Galium echinocarpum* HAYATA** Mater. Fl. Formos. p. 147. Procumbent rooting at the nodes. Stem angular, glabrous or nitid, internodes 2 cm. long. Leaves 6-verticillate, oblanceolate, sessile, 12 mm. long, $3\frac{1}{2}$ mm. broad, rounded mucronate at the apex, (mucronate parts $\frac{1}{2}$ mm. long) attenuate at the base, margin remotely serrate-ciliate, scarcely hairy on the upper surface (hairs ascendent), glabrous on the lower surface. Cymes terminal, few-flowered, branches ternate. Flowers pedicellate. Calyx-tube ovoid, $\frac{2}{3}$ mm. long, densely covered with falcate hairs, limb obsolete. Corolla rotate, 2 mm. in diameter, 4-lobed, lobes ovate, 1 mm. long, $\frac{2}{3}$ mm. broad, obtuse at the apex. Stamens 4, alternate to corolla-lobes, $\frac{1}{2}$ mm. long. Styles 1 mm. long, 2-fid, stigma capitate. Fruits didymous, orbicular, $1\frac{1}{2}$ mm. in diameter, densely covered with hairs (hairs erect and falcate at the apex).

HAB. Mt. Morrison, Mt. Arisan.

Somewhat near *G. trifidum* MICHX.; but greatly differs in having much smaller leaves with ascendent hairs. Comes nearer to *G. Aparine* LINN. from which this is distinguishable by the ascending, but not retrorted, hairs.

***Galium gracile* BUNGE; MATSUM. et HAYATA** Enum. Pl. Formos. p. 200.

HAB. Kōshūn, Tamsui, Kelung.

DISTRIB. Japan and China.

Galium rotundifolium LINN.; DC. Prodr. IV. p. 599; Hook f. Fl. Brit. Ind. III. p. 204; HAYATA Mater. Fl. Formos. p. 148.

HAB. Randaizan; Mt. Morrison, Mt. Arizan.

DISTRIB. Europe, India, North Africa, Western Asia.

OBSERV. Perennial, procumbent. Stem angular in section, hispidulous (hairs retrorse.), internodes 3 cm. long. Leaves 4-verticillate, sessile, oblong or ovate, 13 mm. long, 6 mm. broad, shortly acute at the apex, suddenly attenuate at the base, tri-nerved, margin nearly entire and ciliate, hairy on the nerves of both surfaces, (hairs longer $\frac{1}{2}$ mm. long, divaricate and retrorse), face hairy hairs shorter and fewer. Cymes axillary, paniculate, ternate, branches divaricate. Flowers 5-verticillate at the apex of the branches of cymes, pedicels about 1 mm. long. Calyx-tube glabrous, about $\frac{1}{2}$ mm. in diameter, densely covered with falcate hairs. Corolla rotate, 4-lobed, $1\frac{1}{2}$ mm. in diameter, lobes ovate, $\frac{1}{3}$ mm. long, obtuse at the apex. Stamens 4, style $\frac{1}{2}$ mm. long, deeply 2-fid, stigma capitellate. Fruits didymous broadly obovate, 1 mm. long, $1\frac{2}{3}$ mm. broad, densely covered with straight divaricate falcate hairs.

64. Valerianææ.

Conspectus of the Formosan Genera.

- Corolla shortly 5-lobed, stamens 4 perfect, bracts narrowed, free, bracteoles large adpressed to fruits, appendiculate, corolla white or yellow. *Patrinia*. 1
- Corolla 4-5-fid, nearly equal. Stamens 4, perfect, bracteoles 4, flowers light pink. *Triplostegia*. 2

1. *Patrinia* JUSS.

Key to the Formosan Species.

- Leaves ovate dentate villose, flowers white. *P. villose*.
- Leaves pinnatifid glabrous, flowers yellow. *P. scabiosæfolia*.

Patrinia sabiosæfolia FISCH.; HAYATA, Fl. Mont. Formos. p. 118.

HAB. Mshazan.

DISTRIB. Japan, through China westwards to Dahuria.

Patrinia villosa JUSS.; MATSUM. et HAYATA Enum. Pl. Formos. p. 200.

HAB. Kussaku Shintengai, Tamsui.

DISTRIB. Japan and China.

2. *Triplostegia* WALL.

Triplostegia glandulifera WALL. "Cat. 436"; DC. Prodr. IV. p. 6; CLARKE in HOOK. f. Fl. Brit. Ind. III. p. 215; FORBES et HEMSL. Ind. Fl. Sin. I. p. 399; HAYATA Mater. Fl. Formos. p. 148.

Hackia Aschersoniana ENG. et GR. in DIELS Fl. Centr. Chin. p. 598; HAYATA in Tōkyō Bot. Mag. XX. p. 57, et Fl. Mont. Formos. p. 118.

HAB. Mt. Morrison.

DISTRIB. China; Hupeh, Szechuen; North India.

65. Dipsaceæ.

Scabiosa LINN.

Scabiosa lacerifolia HAYATA Fl. Mont. Formos. p. 119.

HAB. Mt. Morrison, Central Mountains.

New or noteworthy plants of Formosa.

Magnoliaceæ.

Illicium arborescens HAYATA sp. nov. Arborescens, truncus subrectus 12 m. altus, a medio sursum ramosus, ramulis cinerascens (petiolis fuscentibus) glaberrimis subangulatis, foliatis. Folia subopposita, petiolata, lanceolata vel oblongo-lanceolata, 10–8 cm. longa $2\frac{1}{2}$ cm.–2 cm. lata, apice acuminata, ad summum acuta, basi acuta, chartaceo-coriacea, margine integra, costis supra impressis subtus elevatis, venis lateralibus supra tenuissimis, subtus non visis, subtus pallida, opaca, petiolis 1 cm. longis, fuscentibus, supra sulcatis. Flores terminales vel axillares, solitarii vel gemini, pedunculati, pedunculis 1–2 cm. longis, bracteati, semiclausii, depresso-globosi, 8 mm. longi, 10 mm. in diametro, rosei. Segmenta perianthii glabra crassiuscula, 12–15, margine ciliolata, extimis minimis, interioribus magnis, extimis late reniforme cordatis $4\frac{1}{2}$ mm. latis, basi auriculato cordatis, vel semirotundatis 5 mm. longis 7 mm. latis, apice rotundatis basi contractis subcordatis vel rotundatis, ad insertionem $2\frac{1}{2}$ mm. latis, interioribus magnis rotundatis 8 mm. in diametro apice basique rotundatis, basi constrictis ad insertionem 2 mm. latis valde concavis, utrique glabris, intimis plus minus angustioribus. Stamina ∞ , 2-seriatim disposita 2–3 mm. longa, filamentis complanatis, in latitudine variabilissimis, antheris adnatis in forma variabilibus apice truncatis, $1\frac{1}{2}$ mm. longis. Carpella 10–14, 1-seriatim verticillata, latere compressa, a latere visa basi ovata apice caudata, (partibus ovatis 2 mm. longis $1\frac{1}{2}$ mm. latis, caudis 1 mm. vel $1\frac{1}{2}$ mm. longis apice extrorse recurvis), in sectione cuneiformia, dorso obtuse costata, facie acuta, 1-ovulata, glabra. Torus conicus ultra insertionem carpellorum productus, partibus productis brevis columnaribus 1–2 mm. longis.

HAB. Inter Karapin et Funkiko, leg. B. HAYATA et S. SASAKI, Jan. 1912.

The nearest congener of this plant is *I. majus* H. f. et T. (in Hook f. Fl. Brit. Ind. I. p. 40), which is different from our species in having much longer petioles, longer peduncles; another plant resembling ours is *I. Griffithii*

H. f. et T. (Hook. f. Fl. Brit. Ind. I. p. 40) which is distinguishable in having larger greenish (according to Mr. DUNN,) flowers, measuring $1\frac{1}{2}$ cm. in diameter.

Illicium sp. mentioned in my "Fl. Mont. Formos. p. 45" is perhaps a fruiting specimen of the species just described. Leaves are very similar though not exact. Following descriptions of fruits are drawn up from the same specimen. Pedunculi fructiferi 3-4 cm. longi, validiusculi sursum incrassati. Carpella matura 13, horizontaliter verticillata, verticillis 28-30 mm. in diametro, carpellis distinctis, lignosis, compressis, 15 mm. longis 8 mm. latis ad insertionem, margine interiore et superiore dehiscentibus. Semina nitida a latere compressa, complanato-oblonga 8 mm. longa 5-6 mm. lata, basi ad insertionem plus minus obliqua, utrinque obtusa. HAB. Tozan, Mt. Morrison, Mt. Arisan (Nos. 1918, 2028).

***Illicium arborescens* HAYATA var. *oblongum* HAYATA n. v.** Folia oblonga, rarius obovata, apice obtusa vel acuta, coriacea, 7 cm. longa $3\frac{1}{2}$ cm. lata. Pedunculi longiusculi 2-3 cm. longi, cæterum ut typicæ.

HAB. Hieranzan, leg. S. SASAKI 1910.

Olacineæ.

***Gonocaryum diospyrosifolia* HAYATA sp. nov.** Frutex, ramis et ramulis gracilibus valde flexuosis, ramis cinerascens, ramulis in exsiccato fuscentibus vel nigricantibus, teretibus. Folia coriacea supra nitida subtus opaca, rotundata vel ovato-rotundata, interdum medio subplicata vel plicato-curva, basi rotundato-acuta, apice rotundato-obtusa, 8 cm. longa, 7 cm. lata, plus minus obliqua, vel æqualia, margine integerrima, leviter recurvata, venis utraque elevatis, reticulis venularum supra elevatis distinctis, subtus planis inconspicuis, subtus pallidissima flavescens, petiolis $1\frac{1}{2}$ cm. longis. Flores ♂: breve racemosi, racemis 1-2 cm. longis, pauci-floratis, floribus sessilibus vel breve pedicellatis, pedicellis 2 mm. longis, pubescentibus, 1-bracteatis, 2-bracteolatis, bracteis et bracteolis late triangularibus $1-\frac{1}{2}$ mm. longis. Sepala 6, inæqualia, rotundata, vel obtusa, ciliolata, 2 mm. lata, $1\frac{1}{2}$ mm. longa. Corolla crassiuscula 5 mm. longa, cylindracea, tubo 3 mm. longo, limbo 5-lobato, lobis valvatis, triangularibus, apice acutis incrassatis incurvis, 2 mm. longis, basi 2 mm. latis,

Stamina 5 cum lobis corollæ alterna, fauce tubi affixa, antheris sessilibus, ovato-triangularibus, apice acuto-obtusis, emarginatis, basi alte cordatis, $\frac{4}{5}$ mm. longis totiusque latis. Ovarium brevissime conicum $1\frac{1}{2}$ mm. longum totiusque latum, brevissime hirsutum, 1-loculare, 2-ovulatum, ovulis pendulis; stigma ad apicem ovarii obliquum labelliforme $\frac{1}{5}$ mm. longum apice acutum, horizontaliter situm. Drupa obovoideo-ellipsoidea nigra nitens, $3\frac{1}{2}$ cm. longa, putamine crustaceo. Albumen in lobos numerosos arete oppresses divisum.

HAB. Kōshūn: Kuraru, leg. B. HAYATA, Mai., 30, 1912.

Near *G. tarlacense* VID.; differs from it by the much thicker leaves which are pale yellowish green on the under surface in a dried specimen.

Ampelideæ.

Cissus pteroclada HAYATA sp. nov. Herba succulenta, glabra, prostrato-scandens, ad nodos radices non emittens. Caulis 4-angulatus (3 mm. in diametro sectionis), ad angulos late alatus, (alis 1-2 mm. latis) internodiis superioribus 5 cm. longis, ad nodos articulatis, in speciminibus exsiccatis solutis, circhis oppositifoliis simplicibus vel apice furcatis, 5-6 cm. longis filiformibus. Folia alterna, petiolata, glabra, in vivo nitida, crassiuscula, in exsiccato membranacea, petiolata, cordato-ovata, 9 cm. longa, 6 cm. lata, acuminata vel cuspidato-acuminata, basi concavo-truncata, margine sub-integra vel remote minuteque serrulata, 3-5-nervia, venis primariis lateralibus utrinque 2-3, petiolis gracilibus 4 cm. longis, stipulis amplexicaulibus late ovato-rotundatis 2-3 mm. longis latissimis, margine plus minus ciliolatis. Cymæ oppositifoliæ cum pedunculis 3 cm. longæ, pedunculis $1\frac{1}{2}$ cm. longis apice bracteolatis, 3-4-ramosis, ramis plus minus pubescentibus, bracteolis scariosis rotundatis ciliolatis 1 mm. longis, pedicellis 1-2-3 mm. longis. Flores hermaphroditi, apertientes non visi. Alabastrum florum globosum; calyx cupuliformis, 1 mm. longus, $1\frac{1}{2}$ mm. in diametro. Petala 4, duplicato-valvata, (in alabastro) stylus columnaris, stigma punctiforme.

HAB. Sankakuyū: Taihyō, leg. R. KANAHIWA, Juli., 1912.

Near *V. repens*; but differs by the distinct erect petals and winged stem.

Anacardiaceæ.

Semecarpus vernicifera HAYATA et KAWAKAMI sp. nov. Rami cinerascens, lenticellis oblongis notati. Folia alterna, coriacea, elliptico-lanceolata vel ovato-lanceolata, medioeria 23 cm. longa, 7 cm. lata, apice acuta vel breve acuminata, basi obtusa vel acuta, utrinque glabra, subtus glauca, costis supra subplanis vel leviter elevatis, subtus prominente elevatis, venis lateralibus primariis utraque latere 20, angulo 70° a costa egressis, utraque pagine elevato-reticulata, petiolis 3 cm. longis. Flores paniculati, pedicellis brevibus 2 mm. longis, sub pedicello singulo 1-bracteatis, bracteis triangularibus 1 mm. longis, breve ciliolatis, nec non 1-2-bracteolatis, pedicellis apice cum tubis calycis articulatis, brevissime pubescentibus, nigricantibus. Calyx campanulatus, $2\frac{1}{2}$ mm. longus, 5-dentatus vel subinteger. Petala 5, ovato-lanceolata, $5\frac{1}{2}$ mm. longa, $2\frac{1}{4}$ mm. lata, crassiuscula, apice obtusa, basi $1\frac{1}{2}$ mm. lata, truncata, valvata. Stamina 5, cum petalis alterna, petalis breviora, filamentis filiformibus 3 mm. longis, antheris oblongis, dorsifixis, introrsis utrinque emarginatis. Ovarium late ovatum, semi-superius, 2 mm. longum, 1-locurale 1-ovulatum, ovulis supra medium pendulis, stylo obliquo, 3-fido, 1 mm. longo, ramis apice stigmatosis, 3-lobatis. Drupa late complanato-globosa, apice oblique acuta, basi leviter cordata vel rotundata, 23 mm. longa 20 mm. lata, basi calycis valde incrassati campanulati $1\frac{1}{2}$ cm. longi insidens, pericarpio crasso duro resinoso, endocarpio osseo. Semina supra medium pendula, testa membranacea. Embryo crassus, cotyledonibus plano-convexis, radícula brevissima supra.

HAB. Taitō, Karenkō, leg. N. KONISHI; Kōshūn, Garambi, leg. B. HAYATA; Kankaw, leg. Y. TASHIRO, Juli., 1912.

The present plant is a little different from other species of the genus by the valvate petals and in not having cup-like receptacles under the fruits. It is suggested to me by Mr. T. KAWAKAMI who has just returned from his trip to the Malay archipelago that the plant just described may be a new species, as he has not found any plant like this in any regions he visited.

Melastomaceæ.

Pachycentria formosana HAYATA sp. nov. *Tashiraea okinawensis* HAYATA in Mater. Fl. Formos. p. 114 et p. 449 (non MATSUMURA). Frutescens, ad truncos scandens; caulis subteres, cinerascens, rugosus, lenticellis albicantibus multis notatus, ramulis fusco-rubrescentibus lenticellis parce notatis. Folia opposita ovato-lanceolata vel obovato-lanceolata, apice acuta, ad summum obtusa, basi obtusa vel plus minus cuneata, $7\frac{1}{2}$ cm. longa 2 cm. lata vel latiora, integerrima vel subintegra, distincte 3-nervia, nervis supra tenuibus planis vel impressis inconspicuis, subtus prominente elevatis, nervis lateralibus a costa supra basin divaricatis margine parallelis prope apicem costæ attingentibus, crassiuscula, supra in exsiccato fuscentia subtus flavescentia vel pallidissima, utrinque glabra, petiolis 8-10 mm. longis supra sulcatis. Cymæ terminales vel juxta apicem axillares, 4-5 cm. longæ (cum pedunculis) totiusque latæ, ternatim 2-3-plø ramosæ, ad nodos 2-bracteatis, pedicellis 7 mm. longis. Calyx globoso-campanulatus, 4 mm. longus, glaber, tubo subgloboso-campanulato, fauce plus minus contracto, limbo subintegro, plus minus obscure 4-dentato, margine minute ciliolato. Petala 4, valde obliqua rotundata, vel obovato-rotundata, 1 cm. longa totiusque lata, margine integerrima obscure 8-10 nervia, apice oblique rotundata, basi subemneato-truncata, ad insertionem contracta 1 mm. lata. Stamina 8, æqualia ad faucem calysis affixa, filamentis complanatis 5 mm. longis erecto-rucurvis, glabris, antheris erectis latere compressis, ovato-linearibus $3\frac{1}{2}$ cm. longis apice obtusis 1-porosis, basi locellis parallelis non productis, connectivis basi postice breve calcaratis, calcare brevissimo $\frac{1}{5}$ mm. longo. Ovarium calyce adhærens, 4-loculare, ovulis in loculis numerosis, placentis ab angulo interiore loculorum, apice conicum alte 8-sulcatum, stylo filiforme 6 mm. longo apice minute truncato. Bacca subgloboso-turbinata, vel subglobosa purpurascens limbo calysis persistenti coronata, 7 mm. in diametro. Semina flavescentia, minuta, cylindrica, utrinque obtusa, testa crustacea nitida.

HAB. Shintiku: Kareisha, leg. U. MORI, Juni., 1908, (No. 1434); Mt. Arisan, leg. B. HAYATA et S. SASAKI Jan., 1912.

The present plant was erroneously referred by myself to *Tashiraea*, a genus

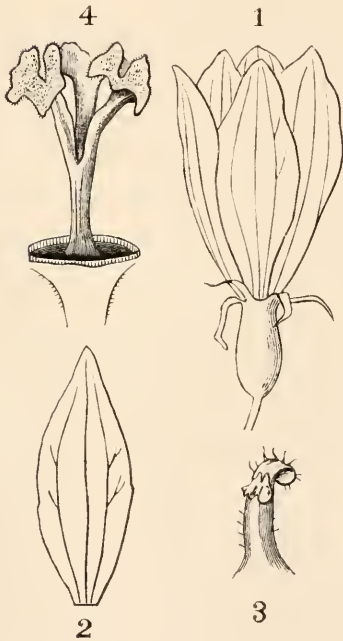
established by Prof. J. MATSUMURA. Soon afterwards, I found that the plant is different from the same genus, to which matter I referred in my "Mater. Fl. Formos. p. 449." In my excursion to the island in the earlier part of this year, I was successful in finding out a fruiting plant which is quite the same as the one which was formerly referred to *Tashiroa*. The fruit is a berry of light purple colour. It is quite clear that this does not belong to *Tashiroa*, the fruit of which is usually a capsule, but does to *Pachycentria*. The latter is distinguished from the former by not auricled anthers and berry.

Medinilla formosana HAYATA sp. nov. Frutex ad truncos scandens, ramis subteretibus, corticibus cinerascens, gracilibus, internodiis 7-10 cm. longis, ad nodos setas numerosas gerentibus. Folia opposita ternata vel verticillata, oblongo-ovata, vel obovato-lanceolata, 10-20 cm. longa, 3-6 cm. lata, sursum obtusa apice breve caudato-acuminata basi attenuato-cuneata, in vivo crassiuscula, in exsiccato sub-membranacea integerrima vel integra pinninervia, venis lateralibus primariis oppositis arcuatis ad apicem costæ attingentibus, utraque glabra, in vivo supra nitida, subtus pallida, subsessilia vel breve petiolata, petiolis 8 mm. longis. Paniculæ terminales vel quasi-laterales, 25 cm. longæ 10 cm. latæ, ramis verticillatis superpositim dispositis angulo 90° divaricatis glabris, floribus ad apicem ramorum 2-plo subumbellatim dispositis, pedicellis ultimis 6 mm. longis, glabris, bracteis minutis linearibus 3 mm. longis. Calyx tetragono-subglobosus glaber 3 mm. longus $2\frac{1}{2}$ mm. latus, fauce plus minus constrictus, limbo ampliato, integro vel obscure 4-dentato, dentibus late rotundatis, vel non dentato. Petala 4, valde obliqua obovata 7 mm. longa, 4 mm. lata, apice obtusa basi cuneata ad insertionem truncata contracta 1 mm. lata. Stamina 8 æqualia ad faucem calycis affixa, filamentis complanatis subulatis 4 mm. longis, $\frac{1}{3}$ mm. latis, antheris 3-4 mm. longis $\frac{1}{2}$ mm. latis subulatis apice rostratis 1-porosis, connectivis basi antice 2-auriculatis, postice 1-calcaratis, auriculis $\frac{1}{2}$ mm.- $\frac{1}{3}$ mm. longis, calcaribus angustioribus vel linearibus $\frac{1}{2}$ mm. longis apice truncatis. Ovarium calycis tubo coherens, apice conico-truncatum, stylo columnari 4 mm. longo sursum subclavato obtuso, stigma punctiforme. Bacca subglobosa, 7 mm. in diametro, apice calycis limbo annulariter coronata. Semina numerosa elongato-obovoidea, 1 mm. longa.

HAB. Hiiransan et Kussuku, leg. B. HAYATA et S. SASAKI 1912, Aug.

Near *Medinilla speciosa* BLUME, (Bot. Mag. t. 4321); but differs by the subterete branches and the stamens with much longer posterior spurs.

Cucurbitaceæ.



Thladiantha punctata ♀.

1. a female flower; 2. a petal;
3. a staminode; 4. a style.

Thladiantha punctata HAYATA in Materials for a Flora of Formosa, p. 119. Supplementa ad descriptionem originalem: Fl. ♀ solitarii axillares, longe pedicellati, pedicellis gracilibus 7 cm. longis. Calycis tubus ellipsoideus 9 mm. longus, 5 mm. latus, basi constrictus, limbo 5-lobato, lobis triangulari-lanceolatis, 7 mm. longis apice acuminato-linearibus, pubescentibus. Petala 5, oblonga, 26 mm. longa, 11 mm. lata, apice obtusa, basi contracta, $2\frac{1}{2}$ mm. lata, 3-nervia, utraque pagine punctato-puberula. Staminodia 5. Styli erecti, 9 mm. longi basi leviter dilatati, apice 3-fidi, ramis apice lamellato-peltato-dilatatis, partibus dilatatis 2-lobatis, margine irregulariter repandatis, facie hirtellatis.

HAB. Toyenchō: Kappanzan, leg. U. MORI et S. SHIMADA, Mart., 1910.

Araliaceæ.

Gilibertia pellucidopunctata HAYATA sp. nov. Frutex vel arborescens, ramis gracilibus patentibus, cortice cinerascete rugoso, ramulis gracillimis glabris patentibus. Folia valde variabilia, nunc elobata, nunc trilobata, nunc longissime nunc brevissime petiolata, si in elobato oblongo-ovata 6–13 cm. longa

2-5 cm. lata, apice semper acuminata vel caudato-acuminata, basi acuta vel cuneato-acuta, 1-nervia, in trilobato obtriangularia in circumscriptione, leviter vel alte 3-lobata 10 cm. longa totiusque lata, basi acuta vel cuneato-acuta, lobis patentibus oblongis apice cuspidato-acuminatis, sinibus inter lobos latis vel angustis acutis vel obtusis, 3-nervia, nervis lateralibus angulo 40° a nervo centrali divaricatis, extrorse arcuatis vel rectis, margine integerrima vel minute et obscure setulosa, utraque pagine glabra, subtus pallidiora, nervis et venis utraque pagine tenuiter elevatis, venis lateralibus secundariis tenuissimis distincte vel obscure reticulatis, pellucido-punctata, basi ad insertionem nervorum lateralium dense hirtella, petiolis nunc brevissimis 1 cm. longis, interdum longissimis laminam 2-plo in longitudine superantibus, 15 cm. longis gracillimis basi \pm dilatatis. Flores umbellati, umbellis circ. 10-floratis solitariis vel geminis, terminalibus, pedunculis umbellarum 2 cm. longis, rectis apice plus minus peltato-dilatatis, peltis rotundatis 10-angulatis $2\frac{1}{2}$ mm. in diametro, supra convexis \pm paleaceis, pedicellis florum 1 cm. longis. Calyx cylindraneo-urceolatus $3\frac{1}{2}$ mm. longus $2\frac{1}{2}$ mm. latus, basi obtusus, apice truncatus, obscure 5-carinatus, limbo brevissimo $\frac{1}{2}$ mm. longo, obscure 5-dentato, dentibus latissimis brevissimis apice minute aristatis. Petala 5, valvata, patentia, reflexa, apice inflexa, oblonga, $2\frac{1}{2}$ mm. longa, basi non contracta $1\frac{1}{3}$ mm. lata, intus 1-carinata apice acuta ad summum acuminata, acuminibus inflexis cum laminis adnatis. Stamina 5, filamentis longiusculis petalum in longitudine æquantibus erectis, 2 mm. longis \pm complanatis. Discus rugosus basi styli connatus. Stylus brevior subconicus 1 mm. longus 5-sulcatus apice 5-fidus, ramis in fructu patentibus recurvis, vel apice 5-lobatus, lobis brevibus apice truncatis, stigmatosis. Fructus sub-baccatus globosus, 3 mm. in diametro siccitate 5-sulcatus, excarpio crassiusculo; pyrenæ 5, a latere compressæ quadrantiformes 3 mm. longæ cartilagineæ, albumine lævi non ruminato. Semina latere compressa, quadrantiformia, ventrali acuta, dorsali rotundata, latere plana, dorso elevato-carinata, testa membranacea.

HAB. Mt. Arisan: Nimandaira, leg. B. HAYATA et S. SASAKI, Jan., 1912; Mt. Morrison ad 7000 ped. alt., leg. U. MORI, 1908. (No. 2041).

This is the first discovery of a plant belonging to this genus. It is near to *G. parviflora* (BENTH. Fl. Hongk. p. 137) and *G. proteum* (BENTH.

Fl. Hongk. p. 137) but differs from them by the longer stamens and fewer-flowered-umbels; also near to *G. dentigera* HARMS (DIELS Fl. Centr. Chin. p. 487) from which our plant can be distinguished by the quite entire leaves. The three congeners above mentioned and the plant just described are very like each other, and the difference, if any, is the slightest. It is, therefore, difficult to know one from another only by descriptions.

Rubiaceæ.

Litosanthes gracilis HAYATA sp. nov. Frutex gracilis 1-2 m. alta, ramis et ramulis gracilibus, hirsutis, ramulis divaricatis oppositis patentibus, teretibus, rectis. Folia opposita, obovata 15 mm. longa 5 mm. lata, apice acuta vel cuspidato-acuta, basi acuta vel cuneata obliqua, supra glabra, subtus ad costas et marginem strigosa, supra costis et venis planis subtus elevatis, venis primariis lateralibus utroque 6-7, simplicibus plus minus arcuatis ad marginem attingentibus, venulis secundariis a costa angulo 90° patentibus, petiolis 1½ mm. longis strigosis. Flores axillares solitarii, longe pedicellati, pedicellis gracilibus patentissimis, angulo 90° divaricatis, folium in longitudine superantibus, hirsutis, 1½ cm. longis, apice pedicellorum 1-floratis vel 2-floratis, basi calycis 1- vel 2-bracteatis, bracteis acuminato-triangularibus hirsutis. Calyx obconico-campanulatus, 2 mm. longus, extus hirsutus, limbo 4-dentato, intus glabro, dentibus acutis, triangularibus margine ciliolatis intus glabris. Corollæ tubus urceolatus, extus glaber ad faucem intus longe barbatus 2½ mm. longus totiusque latus, limbo 4-dentato, dentibus patentibus reflexis ovato-triangularibus 2 mm. longis, apice apiculato-acutis, basi latioribus 1½ mm. latis, extus glabris, intus breve hirsutis. Stamina 4, infra faucem corollæ affixa, filamentis brevibus, antheris oblongis utrinque emarginatis, dorsifixis, ¾ mm. longis. Ovarium inferius, 4-loculare, loculis 1-ovulatis, discus carnosus, stylus columnaris, apice breve 4-lobus, lobis erectis, ovulis erectis anatropis. Fructus baccatus, globosus 3-4 mm. in diametro, nigricans, 4-lobus, 4-pyrenus.

HAB. KUSUKUSU, leg. B. HAYATA et S. SASAKI, Juli., 1912; Botanoshu, leg. G. NAKAHARA.

Near *L. biflora* BL. specimens of which I have never been able to compare with this plant. The description given in "DC. Prodr. IV. p. 465" is not

available for identification. I think, however, from localities of the plants, that the Formosan is perhaps different from the Javan.

Compositæ.

Blumea conspicua HAYATA (Pl. V.) Mater. Fl. Formos. p. 151.

HAB. Exact locality is unknown.

Senecio monanthus DIELS (Pl. VI.); HAYATA Fl. Mont. Formos. p. 139. Herba 70–80 cm. alta, subsimplex (excepte inflorescentiam) remote foliata, foliis 2–5, 15 cm. a se remotis, tenuiter lanata, caulibus teretibus, leviter striatis. Folia alterna, longe petiolata, late cordata, reniformia, lamina 10 cm. longa, 14 cm. lata, apice breve acuta, basi cordata, ad petiolum acuta, margine irregulariter dentata, dentibus latissimis 2 cm. latis 2 mm. longis, remote mucronato-serrulatis, serrulis minutis obtuse aristatis, supra subglabrata, subtus tenuiter lanata, 6–7 nervia. Inflorescentiæ terminales paniculatæ, paniculis pyramidalibus 15 cm. longis 12 cm. latis, ramis patentibus, gracilibus, remote et secunde floriferis, basi non floriferis. Capitula 1-florata, pedicellis 4 mm.–7 mm. longis, pubescentibus, bracteis 2–3, lanceolatis 4 mm. longis, ciliolatis, pubescentibus, bracteis involucralibus 2–3, æqualibus linearibus, 1–1½ cm. longis, 1½ mm. latis, apice obtusis 5-nerviis, margine pellucidis. Corolla 9 mm. longa, tubo 3½ mm. longo, basi plus minus dilatato, ⅓ mm. lato, limbo elongato-infundibuliformi 6 mm. longo, tubum in longitudine superante, apice 1⅔ mm. lato apice 5-lobato, lobis triangularibus 1½ mm. longis, apice obtusis, plus minus incrassatis, exteriore recurvis. Stamina ad apicem tubi affixa, filamentis 4 mm. longis, antheram in longitudine superantibus, glabris, infra apicem leviter dilatatis, antheris linearibus, 3½ mm. longis, apice connectivis productis (partibus productis obtusis brevibus) basi caudatis. Styli filiformes 12 mm. longi, apice 2-lobi, lobis linearibus, recurvatis, complanatis 2 mm. longis, basi leviter dilatati, stylophoris ¼ mm. longis. Ovarium cylindricum 3 mm. longum, basi truncatum, medio ⅔ mm. latum apice cupuliforme, cupula 1 mm. in diametro margine tenuis minute denticulata. Pappi setæ albæ 7 mm. longæ, scabræ. Achænia cylindrica 6½ mm. longa 1 mm. in diametro basi leviter angustiora, apice cupula coronata, facie multo-striata.

HAB. Mt. Morrison, at an altitude of 10000 ft.

DISTRIB. Central China.

Senecio morrisonensis HAYATA (Pl. VII.) Mater. Fl. Formos. p. 155.

HAB. Mt. Morrison.

Senecio taitœnsis HAYATA (Pl. VIII.) Mater. Fl. Formos. p. 156.

HAB. Taitō : Taroko.

Cirsium Kawakamii HAYATA (Pl. IX.) Mater. Fl. Formos. p. 159.

HAB. Mt. Morrison.

Campanulaceæ.

Adenophora morrisonensis HAYATA (Pl. X.) Mater. Fl. Formos. p. 165.

HAB. Mt. Morrison.

Vacciniaceæ.

Vaccinium emarginatum HAYATA (Pl. XI.) in Fl. Mont. Formos. p. 149.

Supplementa ad descriptionem originalem : pedicelli 5 mm. longi, apice dilatati, cum calycibus articulati. Calycis tubus urceolato-campanulatus, 3 mm. longus, limbo 5-lobato, lobis crassiusculis elongato-triangularibus 3 mm. longis, basi dilatatis 2 mm. latis, acuminatis, glabris. Corolla-tubus globoso-urceolatus, 5 mm. longus totiusque latus, limbo brevi, 5-lobato, lobis reflexis, recurvo-revolutis, late triangularibus acuminatis 2 mm. longis 3 mm. latis basi latissimis, extus glabris, intus plus minus pubescentibus. Stamina 10, libera, linearia, filamentis recurvis complanatis, $\frac{2}{3}$ mm. longis pubescentibus, antheris linearibus, cum tubo 5 mm. longis, basi emarginatis, apice attenuatis, ad tubos 2 distinctos abeuntibus, poris 2 terminalibus, dorso infra medium 2-calcaratis, calcaribus 1 mm. longis ex antheris angulo recto divaricatis. Styli filiforme-columnares. Ovarium 5-loculare.

HAB. Montibus in Nantōchō, leg. U. MORI.

Vaccinium japonicum MIQ. var. **lasiostemon** HAYATA (Pl. XII.) Materials for a Flora of Formosa p. 449. Ramuli angulares complanati, ad angulos acuti, glabri, sursum facie sulcati. Folia alterna, breve petiolata, ovato-lanceolata,

vel ovato-oblonga, 18 mm. longa, 6 mm. lata, apice acuta, recta vel leviter falcata, basi obtusa, utraque pagine glabra, margine ciliolato-serrulata, supra venis reticulato-impressis, subtus distincte reticulato-prominentibus, costis supra impressis, subtus elevatis ciliato-setulosis, margine ciliolata, tenuiter coriacea, petiolis brevissimis 1 mm. longis, supra sulcatis, alatis. Flores axillares, pedicellati, solitarii, pedicellis 1 cm. longis, gracilibus glabris, basi 1-2-bracteatis, bracteis lanceolatis. Calycis tubi campanulati, $1\frac{1}{4}$ mm. longi, lobis 4, patentibus, cuspidato-triangularibus, $1\frac{2}{3}$ mm. longis $1\frac{1}{2}$ mm. latis, apice cuspidato-acuminatis, utrinque glabris. Corolla alte 4-lobata, lobis extrorse recurvis, revolutis, linearibus, apice acutis 8 mm. longis $1\frac{1}{2}$ mm. latis basi plus minus latioribus, utrinque glabris, intus planis, extus elevato-1-costatis. Stamina 8, ad basin corollæ breviter coherentia linearia, 1 cm. longa, filamentis linearibus complanatis barbatis $2\frac{1}{2}$ mm. longis $\frac{2}{3}$ mm. latis intus 1-costatis, antheris linearibus 4 mm. longis (excepte tubos) $\frac{1}{2}$ mm. latis intus profunde sulcatis minute punctatis, apice in tubos in longitudine antleram æquantes productis, poris terminalibus rotundatis. Styli erecti, $8\frac{1}{2}$ mm. longi, apice truncati, basi disco annulari elevato suffulti. Fructus ignoti.

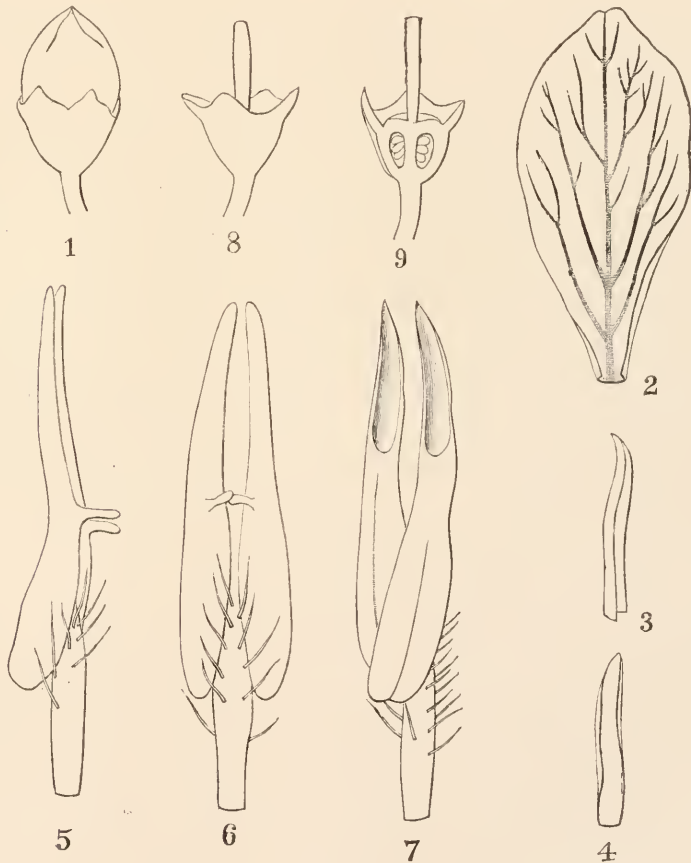
HAB. Randaisan, leg. B. HAYATA et U. MORI, (No. 7012).

Differs from the type by the barbate filaments.

Vaccinium Merrillianum HAYATA, Fl. Mont. Formos. p. 149. Supplementa ad descriptionem originalem. Cataphylla ad basin ramulorum hornotino-rum 8-10 disposita, magnitudine variabilia, superioribus majoribus obovatis apice rotundatis basi angustatis ad stipitem brevem abeuntibus, $5\frac{1}{2}$ mm. longis $2\frac{1}{2}$ mm. latis, margine ciliolatis. Flores breve racemosi, racemis ad apicem ramulorum terminalibus, basi perulatis, (perulis 5-10, rhomboideo-ovatis, $3\frac{1}{2}$ mm. longis, 3 mm. latis, margine ciliolatis) 1-2 cm. longis; floribus 1-bracteatis 2-bracteolatis, (bracteis oblongis apice acutis, basi angustatis integris, 7 mm. longis $3\frac{1}{2}$ mm. latis, bracteolis linearibus 4 mm. longis, acutis) pedicellis 3 mm. longis. Calycis tubus semi-globosus $1\frac{1}{2}$ mm. longus, limbo 1 mm. longo, 5-dentato, dentibus late triangularibus, acutis. Corolla urceolata in alabastro $3\frac{1}{2}$ mm. longa, extus glabra, intus pilosa, 5-lobata, lobis triangularibus. Stamina 10, filamentis $1\frac{1}{2}$ mm. longis, reflexo-pilosis, (pilis longis paucis), complanatis, antheris 2 mm. longis, glabris; loculis linearibus a medio sursum

distinctis, acuminatis, (poris introrsis ovato-linearibus, $\frac{2}{3}$ mm. longis) a medio connatis deorsum distinctis, intus plus minus 1-sulcatis, dorso medio appendiculatis, appendiculis linearibus ascendentibus brevibus $\frac{1}{3}$ mm. longis. Discus annularis. Stylus columnaris, $3\frac{1}{2}$ mm. longus, rectus, sursum minute et densissime pubescens, apice plus minus clavato-truncatus, $\frac{1}{2}$ mm. in diametro.

HAB. Tandaizan, leg. U. MORI April, 1910.



Vaccinium Merrillianum HAYATA.

1. a flower-bud; 2. a bract; 3. and 4. bracteoles; 5. 6. and 7. stamens, seen from different sides; 8. a flower, corolla and stamens taken off; 9. vertical section of the same.

The original description does not give any account about floral parts, for the type specimen was collected after the flowers were over. The flowers which I have described just now were obtained in April in Tandaisan by Mr. U. MORI.

Ericaceæ.

Gaultheria Cumingiana VIDAL (Pl. XIII.) Phanerog. Cuming. p. 184, et Rev. Pl. Vascul. Filip. p. 170; HAYATA in Tōkyō Bot. Mag. XX. p. 72, et Fl. Mont. Formos. p. 150. Frutescens, ramulis gracilibus cinereo-rubrescentibus, terebibus, longitudinaliter rugosis. Folia alterna, breve petiolata, ovato-acuminata, maxima 7 cm. longa $3\frac{1}{2}$ cm. lata, apice acuminata, basi rotundata vel leviter cordata vel truncata, chartaceo-coriacea, margine minute serrulata, ad apicem serrularum crassiuscula, leviter desuper recurva, costis et venis supra leviter subtus prominente elevatis, reticulata, utraque pagine glabra, subtus pallidiora, petiolis 7 mm. longis, supra sulcatis. Racemi axillares solitarii, pauciflorati, pedunculis 2 cm. longis, rachin in longitudine æquantibus, pedicellis 5 mm. longis, sub pedicellis singulis 1-bracteatis, bracteis late rotundatis acutis ciliatis 1 mm. longis, sub floris singulis 2-bracteolatis, bracteolis late rotundatis acutis, $1\frac{1}{2}$ mm. longis, ciliolatis. Calyx campanulato-semiglobosus, 3 mm. longus, tubo $1\frac{1}{2}$ mm. longo, limbo 5-lobato, lobis imbricatis, rotundatis obtusis $2\frac{1}{2}$ mm. longis, basi leviter contractis, margine ciliolatis. Corolla late tubulosa, $5\frac{1}{2}$ mm. longa, 3 mm. lata, tubo $3\frac{1}{2}$ mm. longo, limbo 5-lobato, lobis erectis, $2\frac{1}{2}$ mm. longis 2 mm. latis, oblongo-triangularibus apice obtusis imbricatis, basi non contractis, utrinque glabris. Stamina 10, $3\frac{1}{2}$ mm. longa, basi corollæ breve adnata, filamentis glabris 1 mm. longis complanatis, medio dilatatis, $\frac{1}{3}$ mm. latis, antheris oblongis $1\frac{1}{2}$ mm. longis, $\frac{3}{4}$ mm. latis, basi emarginatis apice 2-fidis, ad apicem in cornua 2 distincta 1 mm. longa productis, cornubus erectis facie sulcatis apice 2-fidis, segmentis patentibus. Glandulæ annulares, dentato-lobulatae ovario adnatæ. Ovarium semi-superius, depresso-globosum 5-lobatum, stylo columnali, 4 mm. longo, apice truncato. Calyces fructiferi accrescentes, fructus semi-amplexantes. Fructus depresso-globosi, 5 mm. lati, tenuiter breviterque pubescentes, leviter 5 lobati, seminibus numerosissimis scobiformibus angularibus $\frac{3}{4}$ mm. longis eleganter minuteque reticulatis.

HAB. Widely diffused in the high regions in the island.

DISTRIB. The Philippines.

Pieris taiwanensis HAYATA (Pl. XIV.) Mater. Fl. Formos. p. 169.

HAB. Common in the high regions in the island.

Rhododendron Kawakamii HAYATA (Pl. XV.) Mater. Fl. Formos. p. 171.

HAB. Mt. Morrison, Mt. Arisan, Mt. Randaisan.

Chimaphila rhombifolia HAYATA sp. nov. (Pl. XVI.). Suffrutescens, parva, caulis simplex, 3–5 cm. altus, tetragonus in sectione, ad angulos sub-latus, 1 mm. in sectione, rubescens, glaber, foliis verticillatis et squamis alternatis instructus, squamis angustatis obtusis 1–2 mm. longis margine denticulato-ciliolatis. Folia verticillata, (fere semper ternata) breve petiolata, membranaceo-coriacea, late rhomboidea, 10–12 mm. longa (cum petiolis), 10 mm. lata, apice acuta, basi subito cuneata, ad petiolum brevissimum gradatim abeuntia, margine dentata, ima basi integra, dentibus acutis triangularibus ascendentibus 1–1½ mm. a se remotis, costis utrinque elevatis venis et venulis subtus inconspicuis, supra elevatis distincte reticulatis. Flores terminales, solitarii, pedunculati, basi pedunculi perulati, perulis sæpe 5–6 variabilibus, exterioribus minoribus ovatis 2 mm. longis apice acutis ciliolatis, interioribus vel intimis magnis obovatis apice rotundatis concavis pedunculum involventibus multinerviis glabris. Pedunculi 2–7 cm. longi erecti recti apice cernui, 2–3-bracteati, bracteis angustatis 4 mm. longis 1 mm. latis obtusis. Flores cernui. Sepala 5, basi plus minus connata, angustata, vel angustoblonga, apice obtusa vel rotundata, 3 mm. longa 1–1½ mm. lata, glabra, margine ciliolata, ciliolis obtusis, 5–7 nervia. Corollæ tubus brevissimus, lobis vel segmentis ovatis apice rotundatis basi leviter contractis, 4½ mm. longis 3½ mm. latis, glabris, margine pauce denticulatis basi integris, 5–7 nerviis, crassiusculis imbricatis concavis patentibus. Stamina 10, a basi petalorum geminatim disposita et petalis opposita, 3½ mm. longa, filamentis 1½ mm. longis nigricantibus complanatis incrassatis glabris, antheris adnatis (basi-fixis) oblongis, apice apiculatis, basi emarginatis, 1½ mm. longis, extrorse lateraliterque sulcatis, basi 2-appendiculatis, appendiculis brevibus flavo-corolatis tubulosis ½ – ⅓ mm. longis introrse incurvis apice truncatis poratis. Ovarium

depresso-globosum, apice 5 lobatum, 2 mm. longum $2\frac{1}{2}$ mm. latum, stylo columnari, $1\frac{1}{3}$ mm. longo, stigmatibus 5-lobato.

HAB. Montibus centralibus, April., 1910, leg. U. Mori.

Very distinct species for the rhombic leaves and glabrous filaments. The relative position of anthers and their appendages are just reverse to what is stated in "BENTH. et HOOK. f. Gen. Pl. II. p. 603."

Myrsineæ.

Mæsa randaiensis HAYATA (Pl. XVII.) Mater. Fl. Formos. p. 177.

HAB. Mt. Randai.

Mysine marginata MEZ. (Pl. XVIII.) HAYATA Mater. Fl. Formos. p. 178.

HAB. Mt. Arisan, Hinokiyama, Mushazan, Randaisan.

Styraceæ.

Symplocos arisanensis HAYATA (Pl. XIX.) Mater. Fl. Formos. p. 187.

HAB. Mt. Arisan.

Symplocos modesta BRAND (Pl. XX.) HAYATA Fl. Mont. Formos. p. 159.

HAB. Taitō: Iryokukaku, Mt. Arisan.

Styrax formosanum MATSUM. (Pl. XXI.) in Tōkyō Bot. Mag. XV. p. 75; MATSUM. et HAYATA Enum. Pl. Formos. p. 235, t. XIV. Fig. 6. Rami teretes glabri, fusco-rubrescentes, leviter rugosi, ramulis gracilibus pubescentibus vel tomentosis cinerascensibus rectis. Folia alterna breve petiolata, obovata vel oblongo-obovata, $4\frac{1}{2}$ cm. longa $2\frac{1}{2}$ cm. lata apice cuspidata vel acuminata ad summum obtusa vel acuta basi cuneata acuta ad petiolum abeuntia, margine obscure et remote serrulata vel subintegra, utraque pagine parce stellato-pubescentia, demum subglabrata, ad costas venasque pubescentia, costis utrinque leviter elevatis, venis tenuibus, membranacea, subtus pallidiora, petiolis 4 mm. longis. Flores racemosi, racemis 2-3-paucifloratis, ad apicem ramulorum terminalibus, pedicellis $1-1\frac{1}{2}$ cm. longis, dense pubescentibus, bracteis minutis vel obsoletis. Calyx campanulatus, 4 mm. longus totiusque latus extus, dense stellato-pilosus intus glaber, 5-lobatus, lobis triangularibus $1\frac{1}{2}$

mm. longis, apice obtusis vel acutis. Corolla campanulata, 13 mm. longa, alte 5-lobata, utraque facie dense adpresse stellato-hirsuta, lobis lineari-lanceolatis 11 mm. longis $2\frac{1}{2}$ mm. latis, margine conduplicatis, apice obtusis. Stamina 10, 2-seriata, iis lobis corollæ alternis longioribus 10 mm. longis, iis lobis corollæ oppositis brevioribus 8 mm. longis, tubo corollæ affixa, filamentis 3 mm. longis complanatis, (partibus basilaribus dilatatis margine tomentosis, partibus superioribus glabris), antheris linearibus filamentum in longitudine duplo æquantibus, adnatis basi 2-lobatis, apice obtusis, facie pilis stellatis paucè obteetis, connectivis leviter productis. Ovarium conicum semi-superius, parce pubescens, 1-loculare, placenta centrali, ∞ -ovulatum, stylo 11 mm. longo, apice truncato. Fructus capsulares ellipsoidei apice rostrati 1 cm. longi 4 mm. lati, ad basin irregulariter fissi, pericarpio calyptriformi, 1-spermi. Semina oblonga 6 mm. longa 4 mm. lata 3-sulcata.

HAB. Shintiku, Taichū; common in the hilly regions of the island.

Styrax Matsumuræi PERK. in ENGL. Pfl.-reich. Styrac. p. 34. Ramuli flexuosi, cortice cinerascenti demum soluto, primum cinereo-tomentosi (tomentis stellatis), demum glabrati. Folia obovata rotundata vel oblonga, maxima 6 cm. longa 4 cm. lata, apice breve cuspidata, acuta vel obtusa, basi cuneato-acuta, acuta, obtusa, vel rotundata, supra primum stellato-pubescentia, subtus stellato-tomentosa, demum subglabrata, costis supra planis vel impressis, subtus elevatis, petiolis brevissimis 1 mm. longis. Flores terminales racemosi, racemis paucifloratis, vel axillares solitarii, bracteis linearibus, 2 mm. longis, pedicellis 8-10 mm. longis, omnino tomentosis. Calyx subcampanulatus, 5 mm. longus, 4 mm. latus, extus dense tomentosus intus glaber margine 5-dentatus, dentibus lineari-triangularibus 1 mm. longis $\frac{1}{4}$ mm. latis, margine serrulatus, serrulis globuliformibus, sinibus inter dentes truncatis, 1 mm. latis. Corolla campanulata, eum lobis 13 mm. longa, extus dense depresse-pubescentia, intus glabra alte 5-lobata, tubo 4 mm. longo, lobis tubum in longitudine duplo æquantibus, lineari-lanceolatis, apice acuminatis, 9 mm. longis, $2\frac{1}{2}$ mm. latis, basi non contractis, margine conduplicatis, 5-8 nerviis. Stamina 10, basi corollæ lobi affixa, 2-seriata, 9 mm. longa, filamentis 3 mm. longis deorsum dilatis, sursum glabris flexuosis, antheris filamentum in longitudine duplo superantibus, loculis ad-

natis pilis stellatis parce dispersis. Ovarium conicum tomentosum (pilis erectis) $1\frac{1}{2}$ mm. longum, stylo 14 mm. longo, apice truncato.

HAB. Mountainous regions of Biōritsu and Taichū.

DISTRIB. An endemic plant.

Oleaceæ.

Fraxinus formosana HAYATA (Pl. XXIII.) Mater. Fl. Formos. p. 189.

HAB. Kōshūn : Maripa.

Osmunthus lanceolatus HAYATA (Pl. XXIV.) Mater. Fl. Formos. p. 192.

HAB. Mt. Tōzan, Mt. Arisan.

Gentianaceæ.

Crawfurdia lanceolata HAYATA (Pl. XXV.) Mater. Fl. Formos. p. 201.

HAB. Randaisan.

Gentiana parvifolia HAYATA (Pl. XXVI.) Mater. Fl. Formos. p. 201.

HAB. Randaisan.

Swertia arisanensis HAYATA (Pl. XXVII.) Mater. Fl. Formos. p. 203.

HAB. Mt. Arisan.

Swertia randaiensis HAYATA (Pl. XXVIII.) Mater. Fl. Formos. p. 203.

HAB. Mt. Randaisan ; Mt. Ganzan.

Boragineæ.

Trigonotis formosana HAYATA (Pl. XXIX.) Fl. Mont. Formos. p. 171.

HAB. Sanchōki, Kishirei, Dakunsha.

Convulvulaceæ.

Erycibe obtusifolia BENTH. Fl. Hongk. p. 236; FORBES et HEMSL. Ind. Fl. Sin. II. p. 156 ; DUNN Fl. Kwangt. a. Hongk. p. 178. Frutex scandens, ramis gracilibus fusco-cinerascentibus glabris teretibus. Folia persistentia ? alterna viridia tenuiter coriacea ovata 8 cm. longa, 5 cm. lata vel minus lata, plus

minus obliqua, apice obtusa basi rotundato-obtusa, apice plus minus plicata, supra nitida, subtus opaca, utrinque glabra, supra ad costas basin tenuissime hirtellata vel glabra, margine integra, costis supra impressis, subtus elevatis venis primariis lateralibus utroque latere 6, angulo 40° a costa egressis, venis et venulis utroque pagine elevatis, exsiccato supra glauca fuscentia, petiolis $1\frac{1}{2}$ cm. longis supra leviter sulcatis. Flores paniculati, paniculis axillaribus terminalibus folia duplo superantibus, divaricatis, si axillaribus, 7-8 cm. longis cum pedunculis, pedunculis 3-4 cm. longis, sursum ramosis, ramis divaricatis alternis oppositis geminatis ternatis, pedicellis ultimis 2-5 mm. longis, florem in longitudine æquantibus vel superantibus, depresso-pubescentibus, bracteis basin pedicellorum obsoletis vel minimis triangularibus latioribus quam longioribus. Calyx 5-partitus, sepalis 5, coriaceis erectis, ovato-rotundatis $2\frac{1}{2}$ mm. longis 2 mm. latis, extus hirsutis, intus glaberrimis, margine ciliolatis, jam athesin, imbricatis, semiclausis. Corolla alba campanulata, 10 mm. longa totiusque lata, vel latiora, tubo obconico-campanulato, 2 mm. longo, limbo late campanulato, intus glabro, (extus partibus expositis alabastrosum villosa-hirsutis lanceolatis crassiusculis, partibus imbricatis tenuissimis glabris) alte 5-fido, lobis duplicato-convolutis obcuneiformibus, 10 mm. longis sursum 6-7 mm. latis margine crenato-undulatis, apice 2-lobatis, lobis quadrangularibus 3 mm. longis apice obtuso-truncatis. Stamina 5, valde inclusa supra basin corollæ affixa, partibus liberibus filamentorum 1 mm. longis complanatis apice angustatis, antheris obcuneatis dorsifixis, apice cuspidatis, $1\frac{1}{2}$ mm. longis basi cordatis, connectivis crassiusculis. Ovarium oblongum 2 mm. longum utrinque truncatum, 4-loculare, loculis 1-ovulatis, stigmate sessili globoso, irregulariter 10-sulcato $\frac{1}{2}$ mm. longo. Fructus baccatus, calyce non accrescenti, obovoideo-ellipsoideus, $1\frac{1}{2}$ cm. longus 1 mm. latus, exsiccato nigricans, 1-spermus, glaber. Semina ovoidea 12 mm. longa, testa membranacea pericarpio adherente, albumine circ. nullo. Embryo pallido-viridis, radícula brevissima caudicula juxta radiculam sita, cotyledonibus (sub-accumbentibus) multilobatis, lobis irregulariter plicatis.

HAB. Mt. Teraso, prope Kōshūn, leg. B. HAYATA et S. SASAKI.

The specimen of the plant just described was collected by Messrs. S. SASAKI and TSUDA, and myself in Mt. Teraso near Kōshūn in my last

trip to the island. It was found twining with profusion of white flowers on a large trunk of a species of (if I am not mistaken) *Quercus*. Another specimen of the plant with fruits was collected by Mr. T. DOI in the central part of the island. It is stated by BENTHAM that the species has a 1-celled-ovary, while my plant has, as I have assured several times, distinctly 4-celled-ovary, each cell having 1-ovule. The Formosan plant has much longer panicles than that described by BENTHAM. The shape of the embryo is very striking. The cotyledons are very irregularly lobed and plicated, bent accumbently and touch closely to the very short radicle. The relative position of the caudicle and radicle is also very peculiar. The former lies not at the foot of, but on the side of the latter. It is, therefore, conceivable that the embryo describes a semi-circle on itself, and brings the caudicle from the foot of the radicle to the side of the latter.

Cuscuta formosana HAYATA sp. nov. Planta volubilis aphylla, ramis gracilibus, glabris, teretibus, 1 mm. in diametro sectionis, pauci-striatis, paucissime lenticellis elevatis notatis. Flores spicato-glomerati, spicis sessilibus $1\frac{1}{2}$ cm. longis 5-6-floratis, rhachibus teretibus crassiusculis 1 mm. in sectione. Flores sub-sessiles, 1-bracteati, bracteis oblongis obtusis valde concavis, $1\frac{1}{2}$ mm. longis, pedicellis brevissimis, crassis, 1 mm. longis. Sepala 5 basi plus minus connata, ovata apice rotundata, basi latissima non contracta, 2 mm. longa, basi $1\frac{1}{2}$ mm. lata, glabra, valde concava, imbricata. Corolla tubulosa, cum lobis 7 mm. longa, tubo cylindrico, utrinque glabro 6 mm. longo, 5-nervato, fauce plus minus contracto, lobis 5 glabris patentibus reflexis, triangularibus, $1-1\frac{1}{2}$ mm. longis, totiusque latis, apice obtusis margine minute obscureque denticulatis. Squamæ intra corollam 5, staminibus oppositæ, tubi corollæ dimidium æquantēs, basi tubi dorso centro deorsum affixæ, margine liberæ, spatulatæ 3 mm. longæ, $\frac{1}{2}$ mm. latæ, apice rotundatæ margine sursum multo deorsum pauciglanduloso-fimbriatæ. Stamina 5, fauce tubi (vel ad apicem tubi) inserta, sessilia, cum lobis corollæ alterna, antheris ovatis apice emarginatis, basi lobatis, $1\frac{1}{3}-1\frac{1}{2}$ mm. longis, $\frac{2}{3}$ mm. latis, connectivis dorso elevatis, oblongis, antheræ dimidium æquantibus. Ovarium globosum $1\frac{1}{3}$ mm. longum, apice ad stylum abeans, 2-loculare, loculis 2-ovulatis, ovulis subglobosis e basi axis ascendentibus, antropis, raphi dorsali, stylo $2\frac{1}{3}$ mm. longo, columnari,

stigmatе globoso bipartito, partibus crassis quadrangularibus $\frac{2}{3}$ mm. longis, longitudinaliter 2-3-rugulosis.

HAB. Akō, Tokubunsha, leg. T. KAWAKAMI, Dec. 1910.

Near *C. japonica* but differs by the much longer tube of the corolla; still nearer *C. reflexa* ROXB., which is distinguishable from our plant in having much shorter style and much divaricated branched stigma.

Lentibulariæ.

Utricularia biflora HAYATA (Pl. XXXI.); Mater. Fl. Formos. p. 210.

HAB. Taiko.

Gesneraceæ.

Titanotrichum Oldhami SOLERED. (Pl. XXXII.); HAYATA Mater. Fl. Formos. p. 211.

HAB. Takow, Shichiseitonzan, Hikaku.

Acanthaceæ.

Lepidagathis formosensis CLARKE (Pl. XXXIII.); HAYATA Mater. Fl. Formos. p. 213.

HAB. Biōritsu.

Lepidagathis stenophylla CLARKE (Pl. XXXIV.); HAYATA Mater. Fl. Formos. p. 214.

HAB. Botansha.

Verbenaceæ.

Callicarpa kotœnsis HAYATA (Pl. XXXV.); HAYATA Mater. Fl. Formos. p. 219.

HAB. Kōtōshō.

Callicarpa longifolia LAM. var. **longissima** HEMSLE. (Pl. XXXVI.); HAYATA Mater. Fl. Formos. p. 220.

HAB. Urusha, Nankōkei.

Callicarpa parvifolia HAYATA (Pl. XXXVII.); Mater. Fl. Formos. p. 222.

HAB. Taitō: Daimari.

Callicarpa randaiensis HAYATA (Pl. XXXVIII.); Mater. Fl. Formos. p. 222.

HAB. Randaisan.

Clerodendron glaberrimum HAYATA (Pl. XXXIX.); Mater. Fl. Formos. p. 216.

HAB. Randaisan.

Clerodendron koshunense HAYATA (Pl. XL.); Mater. Fl. Formos. p. 217.

HAB. Kōshūn: Kurarusha.

Thymelæaceæ.

Daphne arisanensis HAYATA sp. nov. Suffrutex 2–3 m. altus, ramis gracilibus cinerascens ramis ramosissimis, ramulis divaricatis foliatis, cicatricibus minutis cupularibus florum notatis, sursum breve tomentosus. Folia alterna vel subopposita, remota, breve petiolata, membranacea vel chartacea, (vivo subcrassa), lanceolata, apice acuminata, ad summum retusa vel obtusa, basi cuneato-attenuata, integra, 7 cm. longa, $\frac{1}{2}$ cm. lata, costis supra impressis subtus elevatis, venis lateralibus tenuissimis utraque haud visa, petiolis $\frac{1}{2}$ –1 cm. longis, in exsicco rubro-nigricantibus, subulatis, basi vix dilatatis. Flores capitati, capitulis sursum ramulorum axillaribus vel ad apicem ramulorum terminalibus 2–3-fasciculatis 6–7-floratis, inter flores bracteatis, bracteis deciduis lanceolatis, 6 mm. longis, ciliolatis, caducissimis, floribus brevissime pedicellatis, pedicellis 2 mm. longis ad medium articulatis, partibus infra articulationem pubescentibus, partibus supra articulationem glabris sursum ad tubum calycis abeuntibus. Calycis tubus glaber urceolato-cylindricus 4 mm. longus basi rotundatus apice attenuatus gradatim ad limbum abeunt, limbo rotato-campanulato 6 mm. in diametro, 4-lobo, glabro, lobis imbricatis, 2–exterioribus oppositis, 2–interioribus oppositis, triangularibus ovatis apice obtusis margine incurvis, basi auriculato-contractis 2 mm. longis totiusque latis. Stamina 8, 2-seriatim in tubum inclusa, iis superioribus infra faucem

affixis, iis inferioribus ad medium tubi affixis, antheris dorsifixis linearibus 1 mm. longis, apice apiculatis basi emarginatis, filamentis liberis $\frac{1}{3}$ mm. longis glabris. Ovarium cylindrico-ovatum, $3\frac{1}{2}$ mm. longum 2 mm. latum, sursum plus minus angustatum infra stigma \pm contractum 1-loculare, 1-ovulatum, ovulis pendulis anatropis. Stylus 0 vel brevis basi gradatim ad ovarium abeuns. Stigma sessile vel ad apicem styli brevissimorum situm, depresso globoso-punctiforme, $\frac{1}{8}$ mm. in diametro, obscure sulcatum. Bacca ovoidea 7 mm. longa 4 mm. lata, apice apiculata, stigmatibus persistentibus, rubra vel flava, 1-sperma. Semina ovoidea, 5 mm. longa, apice acuta, basi rotundata, obtusa, testa crustacea, a facie 1-albo-striata, albumen 0. Embryo ovoideus, radícula supra brevissime acuta, cotyledonibus carosis crassis magnis 4 mm. longis ovatis apice truncato-rotundatis.

HAB. Mt. Arisan, Nimandaira, leg. B. HAYATA et S. SASAKI, Jan., 1912.

Near *Daphne tangutica* MAXIM., but differs from it by the smaller flowers. I remember having seen two forms of this new species in Mt. Arisan, one with white flowers and yellow berries and the other with yellow flowers and red berries. The distinction is not, however, conceivable in dried specimens. The forms are, I think, variable from one to the other.

Elæagnaceæ.

Elæagnus Oldhami MAXIM. var. **Nakaii** HAYATA n. v. Frutex 2-2½ m. altus, ramosissimus, ramulis subgracilibus, subteretibus vel subtriquetris foliosis, pulvinis elevatis notatis. Folia alterna petiolata, membranaceo-coriacea spathulato-oblongata, apice rotundata vel obtusa, basi attenuata, 8-8½ cm. longa, 2-1.2 cm. lata, margine undulato-repandata, obscure minuteque denticulata supra glabra, subtus dense albo-lepidota, (lepidibus rotundatis margine fimbriatis $\frac{1}{5}$ mm. in diametro,) costis supra tenuibus, subtus valde elevatis, venis primariis lateralibus utrinque 5-6, tenuibus, angulo 30° a costa divaricatis, petiolis circ. 1-½ cm. longis supra sulcatis. Flores Fructus (perianthium fructiferum) ad ramulos brevissimos axillaris, vel brevissime racemosus, rubrus pendulus pedicellatus albo-lepidatus (lepidibus majoribus quam iis foliorum, rotundatis, $\frac{1}{3}$ mm. in diametro, margine lobulatis) ellipsoideus

vel obovoidens brevissime rostratus vel apiculatus 1-spermus $5-5\frac{1}{2}$ mm. longus 4 mm. in diametro, pedicellis 5-6 mm. longis.

HAB. Formosa (cult. in horto Koishikawensi).

Differs from the type only in having much narrower leaves. It was brought back with an example of the type by Mr. T. UCHIYAMA from Formosa, and has been cultivated for nearly fifteen years. Examples of the type and the present variety are planted on a western slope of the Koishikawa garden. It is suggested to me by Mr. T. NAKAI that this may be a new variety of *E. Oldhami* MAXIM.

Euphorbiaceæ.

Blachia Pentzii BENTH. in Journ. Linn. Soc. XVII. p. 226; FORBES et HEMSL. Ind. Fl. Sin. II. p. 435. Rami cinerascens, longitudinaliter rugosi, glabri, ramulis gracilibus nigricantibus, lenticellis minutis notatis. Folia alterna membranacea petiolata, elliptica, obovata, apice abrupte acuminata vel cuspidata vel apiculato-cuspidata ad summum acuminata, (acuminibus $1\frac{1}{2}$ cm. longis) basi obliqua vel aequalia, acuta, obtusa vel rotundata, 11 cm. longa, $4\frac{1}{2}$ cm. lata, margine subintegra, vel obscure repandata, costis et venis utrinque distincte visis, venis primariis lateralibus utrinque 8-9, angulo 50° a costa divaricatis, supra exsiccato fuscentia, subtus pallida, minute pellucido-punctata, petiolis $\frac{3}{4}$ -1 cm. longis. Flores monoccii, racemosi, racemis unisexualibus, iis femineis inferioribus, iis masculinis superioribus. Racemi ♂: solitarii terminales, tenuissimi, 9 cm. longi, paucae ramosi, ramis divaricatis, pauci-floratis, floribus pedicellatis, pedicellis gracilibus 1 cm. longis. Fl. ♂: apertientes 6-7 mm. in diametro, sepala 4-5, patentia, recurvata, reflexa, glabra, oblonga, apice rotundata, imbricata. Petala 5-6, sepalis alterna, emeato-obovata, vel obtriangularia, apice truncato-emarginata, basi acuta, $1\frac{1}{2}$ mm. longa 2 mm. lata, intus minute brevissime pilosissima; glandula disci latissima, quadrangularis crassiuscula, apice truncata, crenulata, $\frac{2}{3}$ mm. longa, $1\frac{1}{2}$ mm. lata. Stamina 25-30, vel pauciora, ad receptaculum planum inserta, filamentis glabris complanatis, 3 mm. longis, antheris adnatis reniformibus, $\frac{2}{3}$ mm. latis, apiculatis, connectivis rotundatis complanatis, loculis fere confluentibus. Rudimentum ovarii 0. Racemi ♀: solitarii axillares vel supra-axillares

tenuissimi, 7 cm. longi, iis ♂ breviores, floribus umbellatim vel racemosim ad apicem pedunculorum 5 cm. longorum 5-6 dispositis, pedicellis 1 cm. longis. Fl. ♀: apertientes 1 cm. in diametro, 7 mm. longi, sepala 5, lanceolata, 7 mm. longa, 2½ mm. lata, apice acuta, basi plus minus contracta, utrinque 1-costata, post anthesin accrescentia, margine paucè setulosa, vel setulis obsoletis. Discus annulari-pulviniformis. Ovarium depresso-ovoideum, stylis 3, basi connatis 2-partitis longissimis horizontaliter patentibus recurvatis.

HAB. Hainan: Hoihon, leg. Z. KATSUMADA, Juli., 1908.

The type specimen I have never seen. It was recorded from the island by various authors. It may, I think therefore, be well conjectured from the same locality that the present plant may be referable to this species.

Pachysandra axillares FRANCH. var. **tricarpa** HAYATA n.v. Frutescens, 20-30 cm. altus, caulis simplex, teres, glaber, sub lente brevissime pubescens, sursum foliatus. Folia longe petiolata, alterna, ovato-oblonga, vel elongato-oblonga, 7-8 cm. longa, 3½ cm. lata, apice acuta, abrupte acuminata vel caudata, basi rotundata plus minus obliqua, margine sursum paucè subdentata, deorsum integra, dentibus brevibus, subtrinervia, vel pinnivena, subcoriacea vel membranaceo-coriacea, utraque pagine subglabra, sub lente minute pubescentia, venis utrinque prominentibus. Flores monœcii, spicati, spicis axillaribus, 1½ cm. longis, dense floratis, (floribus infimis unicis ♀, reliquis ♂) breve pedunculatis, pedunculis 4 mm. longis. Fl. ♂: subsessiles, 1-bracteati, bracteis subtriangularibus, breve pubescentibus, 1½ mm. longis. Perianthii segmenta 4, 2-seriatim oppositamque disposita, oblonga, 3½ mm. longa, 2½ mm. lata, apice rotundata, basi contracta, crassiuscula, margine ciliata, concava, obscure 5-nervia, subglabra. Stamina 4, segmentis perianthii opposita, distincta, 6½ mm. longa, validiuscula, erecto-patentia, filamentis complanatis, 4½ mm. longis, glabris, ½ mm. latis, antheris 2 mm. longis, ½ mm. latis, adnatis, obscure apiculatis. Rudimentum ovarii brevissimum quadrangulare, ⅔ mm. latum. Fl. ♀: subsessiles 6 mm. longi, 1-bracteati, 4-bracteolati, bracteolis valde imbricatis. Perianthii segmenta 5, imbricata, 3 mm. longa, oblonga, apice obtusa, magine ciliolata. Carpella 3, basi connata, extrorse recurvata, stigmatibus linearibus sub lente minute pubescentibus, ovulis 2 in carpellis singulis. Fructus ignoti.

HAB. Tonkarankei, leg. T. KAWAKAMI et U. MORI, Aprili., 1910.

Resembles the type in having axillary spikes, and three nearly distinct carpels; but differs from it by the acuminate or nearly caudate oblong leaves, much longer anthers, and more recurved carpels.

Sarcococca pruniformis LINDL. var. **dioica** HAYATA n.v. Frutex, ramis gracilibus fuscentibus, minute pubescentibus, vel subglabris, teretibus. Folia alterna, exsiccatō fusco-rubrescentia, lanceolata, pinnivena, breve petiolata, 8 cm. longa 2 cm. lata, utrinque acuminate, vel apice acuminate, basi attenuata ad petiolum brevem $1\frac{1}{2}$ cm. longum abeuntia, coriacea, margine integra, recurvata, costis supra impressis vel elevatis, supra glabra, subtus sub microscopio minute lepidota, rubroferruginea vel pallidissima, venis primariis lateralibus utrinque inconspicuis primum rectis, prope marginem abrupte flexuosis recurvis ascendentibus venam superiorem attingentibus. Flores ♀ spicato-racemosi, racemis brevibus 1-2 cm. longis, cum pedicellis 9 mm. longi, pedicellis 6 mm. longis, 1-bracteati, bracteis lanceolatis, 8-bracteolati, bracteolis oppositis, 4-seriatim imbricatisque dispositis, obovatis breve cuspidatis in forma sepalum sub-æquantibus gradatim ad sepalum abeuntibus. Sepala 4, obovata breve obtuseque cuspidata 3 mm. longa $1\frac{2}{3}$ mm. lata, margine ciliolata. Ovarium 2-carpellare, glabrum cum stigmatibus 3 mm. longum, stigma plus minus recurvatum. Fructus ignotus.

HAB. Montibus Centralibus, leg. U. MORI Aprili., 1910.

Near *S. pruniformis* LINDL. (FORBES et HEMSL. In. Fl. Sin. II. p. 418) = *S. trinervia* WIGHT, Ic. t. 1877; but differs from the type by the much longer pedicels of female flowers and by the lanceolate leaves.

Laurineæ.

Machilus micrantha HAYATA sp. nov. Arbor, rami in exsiccatō fusco-purpurascens, glabri, lenticellis notati. Folia alterna, oblonga, vel elliptica, 10 cm. longa vel longiora, 5 cm. lata, apice breve acuminate, basi acuta, integra, coriacea, pinninervia, costis supra planis subtus elevatis, venis lateralibus primariis utrinque 7-8, tenuibus, petiolis 3-4 cm. longis. Alabastrum inflorescentiæ oblongum obtusum, perulis imbricatis, extus sericeo-pubescentibus, iis inferioribus

late rotundatis, superioribus spathulatis, in magnitudine variabilibus. Flores cymoso-paniculati, paniculis sessilibus in circumscriptione globosis 2 cm. longis totiusque latis, ramulis patentibus basi puberulis, floribus apice ramulorum umbellatim fasciculatis, pedicellis 2 mm. longis basi articulatis, apice cum calyceibus continuis, glabris; bracteis et bracteolis desunt. Calycis tubus campanulatus $1\frac{1}{4}$ mm. longus, limbo 6-lobato, lobis oblongis $1\frac{2}{3}$ mm. longis, apice obtusis, extus glabris, intus pauce hirsutis. Stamina perfecta 9, 4-locellata basi lobo calycis affixa, 1 mm. longa, (filamentis barbatis), ordinis primarii et secundarii eglandulosa, antheris late oblongis $\frac{1}{2}$ mm. longis introrsum 4-locellatis, ordinis tertii utrinque glandula brevis stipitata instructa, glandulis globoso-reniformibus, antheris extrorsum 4-locellatis, $\frac{1}{2}$ mm. longis apice emarginatis. Staminodia ordinis quarti $\frac{1}{2}$ mm. longa, stipitibus brevibus barbatis. Ovarium sessile oblongo-ovoideum 1 mm. longum, stylo $\frac{1}{2}$ mm. longo apice truncato. Fructus oblongi 1 cm. longi 7 mm. lati, perianthiis auctis campanulatis, margine obscure crenulatis.

HAB. Sankakuyū: Taihyō, leg. R. KANAHIRA, Juni., 1912.

Remarkable for the very small flowers measuring but 2 mm. in diameter.

Orchideæ.

Bulbophyllum (*Cirrhopetalum*) **flavisepalum** HAYATA sp. nov. Epiphytica, rhizomatibus repentibus radicanibus teretibus 2 mm. in diametro sectionis, pseudobulbis ovoideis 2 cm. longis 1 cm. latis apice obtusis truncatis 1-foliatis. Folia elongato-angustato-oblonga, 7 cm. longa 17 mm. lata, apice rotundata, basi attenuata cum pseudobulbis articulata, margine leviter recurva, supra viridia, subtus pallidiora, crassiuscula, supra plana, venis (exsiccato) utroque latere 8-9, utraque pagine conspicuis. Scapi floriferi e latere pseudobulborum, aphylli 5-4 cm. longi, graciles, vaginis tenuibus 3-4 instructi, vaginis inferioribus imbricatis, superioribus remotis ore obliquis acutis, 6 mm. longis. Flores 5-10, flavescentes, 1 cm. in longo diametro, laxè umbellati, rhachibus 2 mm. longis, pedicellis gracilibus, 9-10 mm. longis basi 1-bracteatis, bracteis fusco-purpurascens, 3 mm. longis. Sepala valde inæqualia, posticum liberum, minus, rubro-purpurascens, ovato-quadrangulare, $3\frac{1}{2}$ mm. longum, basi $2\frac{1}{3}$ mm.

latum, 3-nerviū, basi latissimum leviter contractum, apice obtusum, lateralia valde longiora linearia 13 mm. longa 3 mm. lata, 3-nervia, sed basi 5-nervia, flava, nervis rubescentibus, apice obtusa, basi plus minus obliqua, basi columnæ pedi adnata mentum 2 mm. longum formantia, supra basin introse tortuosa latere exteriori a se coherentia, facie exteriori basi 3-lineari-maculata. Petala breviora quam sepalo postico, oblonga, 3 mm. longa $1\frac{2}{3}$ mm. lata, apice rotundata, 3-nervia fusco-purpurascens, leviter reflexa vel concava. Labellum brevius mentum in longitudine æquans basi erectum a medio sursum valde extrorse recurvum, crassiusculum, margine erectum apice obtusum acutum vel emarginatum, medio discis linearibus 1 vel 2 instructum, 2 mm. longum basi purpurascens. Columna brevissima, $1\frac{1}{3}$ mm. longa, apice (clinandrium) latere bicornuta, basi in pedem 2 mm. longum producta, (pede interiore recurvo lineari complanato) apice abrupte incurvis dilatatis. Anthera globosa, $\frac{1}{2}$ mm. in diametro. Pollinia 4; 2 majora, 2 minora. Capsula prematura cylindrico-fusiformis, 2 cm. longa 5 mm. lata, apice obtusa, basi attenuata, triquetra, facie leviter 1-costata.

HAB. M. Arisan, prope Taroyen, leg. B. HAYATA et S. SASAKI, Jan., 1912.

The orchid was found creeping on a large stone at a sunny place on the left side of the Arisan-road near Taroyen.

Bulbophyllum gracillimum HAYATA sp. nov. Epiphytica, caulibus gracillimis prostratis ad nodos radicantibus, teretibus $\frac{3}{8}$ mm. in diametro sectionis, internodiis 1-2 cm. longis, ad nodos vaginatis, vaginis 3 mm. longis, ore truncatis. Folia sessilia crassa, elliptica vel elongato-elliptica, 22 mm. longa 9 mm. lata apice rotundata mucronata vel emarginata, basi plus minus contracta ad petiolum 1-2 mm. longum abeuntia, multinervia. Racemi axillares, 1-2-florati, 2 cm. longi, graciles, basi vaginati, vaginis 1-2 mm. longis, basi pedicellorum 1-bracteati, bracteis ovatis acuminatis 3 mm. longis $1\frac{1}{2}$ mm. latis, pedicellis cum ovario 2-3 mm. longis. Sepala inæqualia, posticum oblongo-angustatum 3 mm. longum $1\frac{1}{3}$ mm. latum apice obtusum basi non contractum, 3-nerviū, lateralia basi pede columnæ adnata basi valde obliqua 3-nervia, 3 mm. longa. Petala minutissima, linearia, $1\frac{1}{2}$ mm. longa, 1-nervia. Labellum $1\frac{1}{2}$ mm. longum, $\frac{1}{3}$ mm. latum, basi erectum interiore recurvum, medio sursum ab-

rupte exteriore recurvum, medio marginis valde transverse repandato-plicatum. Discus 3-lamellatus. Columna brevissima, latere antice breve cornuta, basi in pedem $1\frac{1}{2}$ mm. longum producta, cum sepalis mentum formans.

HAB. Nokōzan, leg. T. KAWAKAMI et U. MORI Jan., 1908.

Bulbophyllum viridiflorum HAYATA sp. nov. Epiphytica, pseudobulbis ovoideis, 2 cm. longis 1 cm. latis, 1-foliatis. Folia crassiuscula solitaria, elongato-oblonga, 3-5 cm. longa, 10-12 mm. lata, apice obtusa, ad centrum acuta, basi contracta, ad petiolum 5 mm. longum abeuntia, supra viridia ad costas impressa, subtus elevata, pallidiora. Scapi sub pseudobulbo, aphylli, 6 cm. longi, descendent-recurvi basi 2-3-vaginati (vaginis imbricatis 7 mm. longis, apice plus minus dilatatis ore obliquis) inferiore 1-vaginati, (vaginis dilatatis 12 mm. longis 8 mm. latis basi contractis, apice dorso cuspidato-acutis,) uniflorati, apice gradatim ad ovarium abeuntes. Flores solitarii, apertientes 5 cm. in diametro, pallido-viridescens. Sepala valde inaequalia, posticum oblongo-ovatum, 28 mm. longum 14 mm. latum, apice obtusum, basi leviter contractum 5 mm. latum, 7-nerviū, lateralia valde obliqua ovata 23 mm. longa 18 mm. lata apice obtusa, basi leviter contracta, cum pede columnæ connata, mentum 1 cm. longum formantia, 9-nervia. Petala cum sepalo postico conformia, minora, 23 mm. longa, 11 mm. lata, apice subacuta vel obtusa, basi leviter contracta, 5-nervia. Labellum basi erectum a medio recurvato-patens, 15 mm. longum totiusque latum, inferiore latere membranacea a medio sursum spongioso-crassum rugosum medio 1-sulcatum, apice viridescens minute rubro-punctatum, apice subacutum vel obtusum margine inferiore eroso-denticulatum sursum integrum, basi appendiculatum, appendiculis retrorsis, brevissimis 2-lobatis, brevissime unguiculatum cum pede columnæ articulatū. Columna brevissima vel nulla, basi pedem producta, pede 2 cm. longo, 4 mm. lato, a basi usque ad medium cum sepalis connato, sed a medio sursum libero, angulo 90° inflexo, apice leviter concavo ad summum contracto, cum ungue labelli articulato. Pollinia 4, sessilia. Ovarium breve 6 mm. longum.

HAB. Mt. Arisan, leg. B. HAYATA et S. SASAKI Jan., 1912.

Flowered in May in a green house of the Koishikawa Garden. In February this year it was brought back to the Garden by myself from Mt.

Arisan. It was found on a large trunk of a *Quercus* at Nimandaira. Very distinct for the comparatively large flowers of greenish colour.

Cleisostoma ioncsma LINDL. "Bot. Regist. (1847) t. 41;" WALP. Ann. I. p. 791; RIDLEY in Philip. Journ. Sc. I. Suppl. (1906) p. 39; MAKINO in Tōkyō Bot. Mag. XXII. p. 60.

HAB. Formosa, loco non indicato, leg. R. W. IRWIN, Jan., 1912; Urai, Kōshūn: Terasoyama, leg. B. HAYATA et S. SASAKI, Aug., 1912.

The orchid is found plentifully in the woods in Mt. Teraso. It is quite common in the hilly regions of the island.

Cleisostoma oblongisepala HAYATA sp. nov. Herba epiphytica, radicibus teretibus 3-4 mm. in sectionis diametro, caulibus 25 cm. longis a basi usque ad apicem foliosis, teretibus, 4-5 mm. in sectionis diametro, vaginis foliorum imbricatis caulem amplectantibus glabris. Folia crassa, viridia, glabra, disticha, alterna, angustata, 10 cm. longa 17 mm. lata, apice aristato-acuta basi abrupte contracta ad vaginam abeuntia, supra ad costas impressa, supra plana, costis et venis non visis, basi plus minus tortuosa, cum vaginis articulata, margine integra plus minus recurvata, vaginis cylindraceis circ. 3 cm. longis, ore truncato-obliquis. Racemi axillares, breves, 2 cm. longi, pauciflorati. Flores apertientes 1 cm. in diametro, albicantes centro rubescentes, pedicellis brevibus (cum ovariis) 4 mm. longis triquetris, 3-costatis, bracteis brevibus 1-2 mm. longis triangularibus basi dilatatis pedicellum semi-amplectantibus. Sepala posticum oblongum 7 mm. longum $4\frac{1}{2}$ mm. latum, apice rotundatum concavum, lateralia plus minus obliqua, breviora quam postico. Petala obovato-oblonga, $6\frac{1}{2}$ mm. longa, $3\frac{1}{2}$ mm. lata. Labellum plus minus versus apicem rubescens, ad columnam adnatum, $4\frac{1}{2}$ mm. longum basi saccatum, (sacco brevi, squama postica clauso, squama lineari, minute hirtella,) 3-lobatum, lobis lateralibus minutis ad latus oris saccae adnatis obtusis dentiformibus, lobo medio erecto emarginato centro mucronato, intus hirtellato. Anthera 2 mm. longa antice breve producta. Pollinia 4, per paria conferta, stipite hyalino; Columna apice rubescens, 3 mm. longa.

HAB. Botansha, leg. C. OWATARI, 1898. The orchid was brought back to the Koishikawa Garden by Mr. C. OWATARI in his first expedition to Formosa.

It flowered in April, this year, in the green house. It is near *C. breviracema* HAYATA, but differs from it in having oblong sepals and much shorter labellum.

Cremastra triloba HAYATA sp. nov. Herba terrestris, rhizomate erecto tuberoso ovoideo-globoso, $1\frac{1}{2}$ cm. longo, basi totiusque lato, apice acuto, basi latissimo, 2-3 nodoso, ad nodos vaginato, (vaginis defectis), ad apicem folium unum gerente, ad nodos juxta apicem scapum unum gerente. Folia solitaria longe petiolata, basi petiolum 1 (vel 2?) vaginis instructa, (vaginis petiolum in longitudine superantibus apice plus minus dilatatis obtusis), petiolis 10-12 cm. longis dimidium laminae in longitudine æquantibus, subteretibus, tubulosis, laminis cum petiolum articulatis, elliptico-lanceolatis, 30 cm. longis, 5 cm. latis, apice acutis, basi attenuatis linearibus, (partibus linearibus 6-7 cm. longis 3 mm. latis plicatis, petiolis articulato-continuis) membranaceis, venis elevatis subplicatis. Scapi solitarii, 30-40 cm. alta, teretes, 5 mm. in sectionis diametro, basi 2-nodosi, internodiis inferioribus 4 cm. longis, superioribus 10 cm. longis, ad nodos vaginatis, (vaginis tubulosis, 5-6 cm. longis, apice acutis vel obtusis,) partibus florigeris 10-15 cm. longis, racemosis. Flores ascendento-patentes, vel erecto-patentes, plus minus secundi, 3 cm. longi, segmentis conniventibus apice vix patentibus, pedicellis (cum ovariis) 13 mm. longis, bracteis lanceolatis 8 mm. longis. Sepala sub-æqualia conniventia, lineari-oblancoolata, apice acuta, basi attenuata, posticum 33 mm. longum 4 mm. latum, basi non contractum, lateralia plus minus obliqua. Petala angustiora lineari-oblancoolata, breviora quam sepalis, 30 mm. longa, 3 mm. lata, apice acuta, basi attenuata. Labellum lineare, sepalum posticum in longitudine æquans, 33 mm. longum, versus apicem 3-lobatum, (lobo medio oblongo, 8 mm. longo $3\frac{1}{2}$ mm. lato, apice obtuso vel rotundato basi non contracto, lobis lateralibus angulo 45° divaricatis lanceolato-triangularibus basi latere inferiore auriculatis plicatis 4 mm. longis apice obtusis vel acutis), basi lobi medii 1-appendiculatum, appendiculis liguliformibus liberis crassiusculis minute-tuberculatis, margine a lobis lateralibus usque ad basin plicato-inflexum, basi leviter ventricosum. Columna linearis 23 mm. longa, labello brevior, exalata, apice dilatata, partibus dilatatis obtriangularibus, 3-4 mm. latis, rostellum latissimum. Pollinia 4.

HAB. Mt. Nashitanzan, Mt. Rontabunzan, Jiōgesha, leg. U. MORI, Aprili., 1910.

Near a small form of *C. Wallichii*, but differs distinctly by the labellum, the lobes of which are much more divaricate. In the Indian species, the side lobes of lips are nearly parallel to the middle lobe.

Cypripedium japonicum THUNB. Fl. Jap. p. 30; FR. et SAV. Enum. Pl. Jap. II. p. 40; FORBES et HEMSL. Ind. Fl. Sin. III. p. 65.

HAB. Rontabunzan leg. U. MORI, Aprili., 1910.

I fail to distinguish this from the Japanese Orchid.

DISTRIB. China and Japan.

Cypripedium macranthum SW.; Bot. Mag. t. 2938; FR. et SAV. Enum. Pl. Jap. II. p. 40; FORBES et HEMSL. Ind. Fl. Sin. III. p. 66.

HAB. Montibus Centralibus, leg. U. MORI, 1910.

This and the preceding are the first records of the genus from the island.

DISTRIB. Central Russia, to Eastern Siberia, China and Japan.

Didymoplexis subcampanulata HAYATA sp. nov. Herba tenuis aphylla, rhizomatibus tuberiferis, tuberis fusiformibus $1\frac{1}{2}$ cm. longis 6–7 mm. latis moniliforme 2–3 continuis. Scapi erecti, 5–6 cm. longi, teretes, inferiore 1–2-nodosi, ad nodos squamis unis instructi, squamis fissis vel integris 4 mm. longis, triangularibus, partibus floriferis $2\frac{1}{2}$ cm. longis, superiore sub floribus singulis 1-bracteatis, bracteis late triangularibus apice obtusis basi latissimis $2\frac{1}{2}$ mm. longis 3 mm. latis. Flores spicati, inferiore 3 mm. a se remoti, superiore plus dense dispositi, subcampanulatim patentes, 1 cm. longi 5 mm. lati, pedicellis cum ovariis 12 mm. longis. Sepala: posticum elongato-oblongum 1 cm. longum 4 mm. latum apice rotundatum, inferiore cum petalis connatum, lateralia postico æquilonga se latere interiore a basi usque ad medio connata, superiore libera, apice rotundata. Petala cum sepalo postico sub-similia sed breviora. Labellum late cuneato-triangulare 5 mm. longum ad apicem truncatum 6 mm. latum apice erosum basi breve unguiculatum, unguibus $\frac{1}{2}$ mm. longis, apice unguinum 1-appendiculatum, appendiculis lamellatis erectis latissimis, medio 3-seriatim cristato-tuberculatum, tuberculis lamelli-

formibus. Columna 5 mm. longa apice alata basi exalata. Capsula oblonga, utrinque contracta, 17 mm. long 8 mm. lata, 6-valvatum dehiscens, valvis ad utraque extremitatem unitis 3 latioribus 3 angustioribus, extus parce minute tuberculata. Semina minutissima filiformi-linearia $1\frac{1}{4}$ mm. longa.

HAB. Kōshūn, leg. T. KAWAKAMI, Mart., 1910, et B. HAYATA Ang., 1912.

Near *D. pallens*, GRIFF., but differs from it by nearly campanulate flowers with obtriangular lips. *D. pallens* GRIFF. figured in Ann. Roy. Bot. Gard. Cale. V. t. 346, has rather tubular flowers with cuneate oblong lips. The description of capsules just given is drawn up from another specimen which was doubtingly referred to *D. pallens* by myself in my Materials for a Flora of Formosa p. 347. The type specimen, with several duplicates, was first collected by Mr. T. KAWAKAMI at Kōshūn. The plant was also found by myself in my excursion to the island in the beginning of July, this year, on the sandy ground in a clump of shrubs near sea shore on the eastern coast of the south cape.

Eria tomentosiflora HAYATA sp. nov. Caulis teres, 15–20 cm. longus, 1 cm. in diametro sectionis, erectus, simplex, vaginis imbricatis dense vel remote instructus, sursum foliatus, vaginis sub-cylindricis 3 cm. longis apice rotundatis superioribus plus minus reflexis 8–10 nerviis. Folia sub-sessilia lanceolata, vel lineari-lanceolata, apice obtuse-mucronata, basi attenuata, ima plus minus dilatata, cum vaginis articulata, 7–8 cm. longa $1\frac{1}{2}$ cm. lata, venis lateralibus utroque latere 3–4, inter se multivenulata, crassiuscula, vaginis foliorum cum iis caulium conformibus, sed apice truncatis. Racemi axillares, 4–5 cm. longi, 5–10-florati, rhachibus dense rubro-ferrugineo-tomentosis, bracteis primum tomentosis demum glabratiss lanceolatis 6 mm. longis, pedicellis (cum ovario) 3–4 mm. longis. Sepala subaequalia extus primum tomentosa demum glabrata intus glabra, posticum lanceolato-triangulare, 4 mm. longum $1\frac{1}{2}$ mm. latum, apice obtusum, basi non contractum, obscure 3-nerviū, lateralia obliqua quam postico latiora, ovato-triangularia, $4\frac{1}{2}$ mm. longa, basi $2\frac{1}{2}$ mm. lata, obscure 3-nervia, apice obtusa, basi cum pede columnae adnata, mentum formantia, basi non contracta. Petala angustiora, quam sepalis minora elongato-ovata, $3\frac{2}{3}$ mm. longa $1\frac{1}{2}$ mm. lata, apice obtusa basi non con-

tracta. Labellum cum mentum articulatum ovatum $2\frac{1}{2}$ mm. longum 2 mm. latum, plus minus medio plicatum apice cuspidato-acutum, basi valde contractum, trinervium, prope basin discis linearibus 4 instructum. Columna $2\frac{1}{2}$ mm. longa 1 mm. lata, (clinandrium truncatum), basi in pedem $2\frac{1}{2}$ mm. longum producta. Pollinia 8.

HAB. Kōshūn, Hieranzan, leg. T. KAWAKAMI et S. SASAKI, 1911, Feb.

Near *Eria formosana* ROLFE, (Kew Bull. (1896) p. 194), of which I made a rough sketch, when I was at Kew. As the original description of the species is not here accessible, it is quite doubtful whether it is different from our plant or not.

Eria nudicaulis HAYATA sp. nov. Caulis crassus, cylindrico-teres, 25 cm. longus, 1 cm. in diametro sectionis, basi 1-2 squamatus, (squamis brevissimis late ovatis apice rotundatis 1 cm. longis), basi radices emittens, (radicibus molle tomentos), a basi sursum remote squamatus, (squamis tenuissimis hyalinis apice triangularibus obtusis demum evanescentibus,) nodis non conspicuis, internodiis 3-5 cm. longis, apice pauce foliatis. Folia crassa, elongato-oblonga, 15 cm. longa 3-4 cm. lata, apice obtusa, plus minus plicata, basi attenuata, ima plus minus dilatata, cum vaginis foliorum articulata, venis utroque 4-5, (in exsiccato prominentibus), inter venas multivenulosa, vaginis foliorum brevioribus 1 cm. longis. Spicæ axillares 10-20 cm. longæ a basi usque ad apicem floriferæ, glabræ, bracteis ovatis 4 mm. longis acutis $2\frac{1}{2}$ mm. latis, pedicellis (cum ovario) 5 mm. longis. Sepala subæqualia lanceolata 7-nervia, 7 mm. longa 2.5 mm. lata, glabra, posticum liberum, lateralia obliqua basi ad pedem columnæ adnata mentum formantia, basi $1\frac{1}{2}$ mm. lata apice obtusa vel acuto-obtusa basi leviter contracta. Petala lanceolata 3-nervia quam sepalo postico breviora, 6 mm. longa $2\frac{1}{2}$ mm. lata apice acuminato-obtusa basi leviter contracta. Labellum triangulari-ovatum vel rhomboideo-ovatum apice acutum, basi abrupte contractum cum pede columnæ articulatum, 3 mm. longum, 2 mm. latum, apice 3-nervium, utroque latere discis unis linearibus arcuatis crassis instructum. Columna brevis $1\frac{1}{2}$ mm. longa 1 mm. lata, obovata, apice dilatata, basi contracta, in pedem $1\frac{1}{2}$ mm. longum angustatum $\frac{1}{4}$ mm. latum producta. Anthera distincte 2-locularis, loculis imperfecte 4-locellatis. Pollinia 8?

HAB. Urai, leg. T. Sōma, Juni., 1910, et B. HAYATA et S. SASAKI Aug. 1912.

Near *Fria luchuensis* YATABE (in Tōkyō Bot. Mag. VII. p. 131, t. 6.), but differs from it in having smaller flowers and shorter column.

The stem is at first afforded with a few thin transparent scales; but they soon decay and remain fibers on the nodes, then the stem looks like quite naked.

Ione Sasakii HAYATA sp. nov. Epiphytica, rhizomate repente terete, $1\frac{1}{2}$ mm. in diametro sectionis, pseudobulbis remotis elongato-ovoideis 1 cm. longis 3-4 mm. latis apice attenuatis basi contractis 1-foliatis. Folia solitaria oblongo-linearia 5 cm. longa 7 mm. lata, apice rotundata ad centrum emarginata vel breve 2-lobata, basi attenuata cum bulbis articulata, crassiuscula. Flores racemosi, racemis sub pseudobulbo paucifloratis 3 cm. longis nodosis, interdodiis 5 mm. longis, ad nodos 1-vaginati, vaginis inferioribus 1 cm. longis, tubuliformibus, superioribus laminatis, laminis apice acuminatis, sub floris singulis 1-bracteatis, bracteis ovatis 1 cm. longis 5 mm. latis apice acuminatis vel acutis basi leviter contractis, pedicellis (cum ovariis) 1 cm. longis. Flores patentes. Sepala subæqualia elongato-triangularia vel elongato-ovata, posticum 10 mm. longum $4\frac{1}{2}$ mm. latum apice acutum vel acuminatum basi contractum 5-nervium, lateralia angustiora et longiora quam iis posticis, 11 mm. longa 4 mm. lata apice acuminata basi cum pede columnæ connata latere superiore basi angularia, (angulis acutis), latere inferiore basi rotundata. Petala elongato-cuspidato-triangularia 7-8 mm. longa, basi latissima 3 mm. lata non contracta apice lineari-cuspidata, (cuspidibus linearibus crassiusculis) margine inferiore denticulato-ciliata. Labellum cuspidato-rotundatum 5 mm. longum 3 mm. latum apice longe cuspidatum, (cuspidibus linearibus 4 mm. longis), basi abrupte contractum cum pede columnæ articulatam 3-nervium valde concavum basi ad medium 2-lamellato-appendiculatum. Columna fere nulla, basi in pedem $2\frac{1}{2}$ -3 mm. longum productum, pede cum sepalis lateralibus mentum formanti.

HAB. Mt. Arisan, leg. B. HAYATA et S. SASAKI Jan., 1912.

Near *I. intermedia* KING et PANTLING, in ANN. Roy. Bot. Gard. Cale.

VIII. t. 210; but differs by much acuminate or even caudate segments of the perianth. It was collected and sent to me by Mr. S. SASAKI with flowers preserved in alcohol, upon which the above description is based. It was also collected by myself, in January, this year, in the woods near Nimandaira in Mt. Arisan and was brought back to the Koishikawa Garden where it flowered in August, in open air.

Listera morrisonicola HAYATA sp. nov. Caulis gracilis erectus, simplex, teres, (cum spicis) 10–15 cm. altus, 1 mm. in diametro sectionis, glaber, medio foliis oppositis 2 instructa, apice florem spicatum gerens. Folia 2 opposita globoso-ovata 2 cm. longa $1\frac{1}{2}$ cm. lata, apice acuta plus minus callosa, basi rotundata, margine integra crassiusculo-membranacea, utrinque glabra, subtus pallidiora, costis et venis tenuissimis, utroque latere 3–4 nervata, inter nervos laterales reticulato-venulosa. Spicae terminales, simplices, 2–3 cm. longae pauciflorae, rhachibus puberulis, bracteis ovato-lanceolatis 6 mm. longis 3 mm. latis apice obtusis obscure 3-nerviis, pedicellis cum ovario aequilongis 5 mm. longis. Flores patentes $1\frac{1}{2}$ –2 cm. in longo diametro. Sepala subaequalia 1-nervia, posticum lanceolatum 7 mm. longum 2 mm. latum. Petala lineari-lanceolata 1-nervia, sepalo aequilonga 1– $1\frac{1}{2}$ mm. lata. Label- lum elongato-obtriangulare, 1 cm. longum 5 mm. latum, apice leviter 2-lobum vel emarginatum basi concavum, margine sursum obscure denticulatum, prominente 3–5 nervium, nervis apice furcatis, inter nervos minute reticulatum. Columna 3 mm. longa, anthera angustata 1 mm. longa vel longiora. Capsula obovoidea prominente 3-costata inter costas 1-nervata, 8 mm. longa 4 mm. lata. Semina scobiformia angustiora, utrinque alata, cum alis $\frac{1}{2}$ mm. longa.

HAB. in Mt. Morrison, ad 11000 ped. alt., leg. T. KAWAKAMI et S. SASAKI Oct., 1909.

Remarkable for the large flowers which measure nearly 2 cm. in long diameter.

Nervilia yæyamensis HAYATA sp. nov. Scapi aphylli, 40–50 cm. longi, inferiore ad nodos vaginati, internodiis 10 cm. longis, vaginis 3 cm. longis ore obliquis laminis obtusis, medio squamis unis instructi, squamis amplexicaulibus, elongatis 3 cm. longis acutis, partibus floriferis 10–15 cm. longis, bracteis

lanceolatis, pedicellis (cum ovariis) 6–7 mm. longis, floribus horizontaliter patentibus vel nutantibus. Flores semipatentes, 23 mm. longi. Sepala subaequalia linearia, posticum 17 mm. longum $2\frac{1}{2}$ mm. latum apice acutum basi leviter attenuatum non contractum 3-nervium, lateralia vix latiora quam iis posticis 17 mm. longa 3 mm. lata 3-nervia apice acuta basi attenuata non contracta. Petala linearia 16 mm. longa 2 mm. lata apice acuta basi attenuata, non contracta. Labellum ovatum 17 mm. longum 10 mm. latum apice 3-lobatum, lobis lateralibus acutis brevibus, lobo medio latiore ovato 6 mm. longo 5 mm. lato apice obtuso basi non contracto, centro basi trinervium, additis venulis lateralibus obliquis plurimis, supra barbato-hirsutum. Columna semiteres 6 mm. longa, apice plus minus clavata exalata. Pollinia 2 granulosa. Ovarium obovoideum $3\frac{1}{2}$ mm. longum apice truncatum basi distincte constrictum prominente 3-costatum inter costas 1-costulosum.

HAB. Yäyama; Ishigakishima, Juli., 1910,

Near *Pogonia Scottii* REICHB. f. in ANN. ROY. BOT. GARD. CALIF. VIII. t. 360; but differs by the barbate lips with obtusely contracted base.

Oreorchis gracilis F. et Z. var. **gracillima** HAYATA n. v. Terrestis, pseudobulbis conico-ovoideis, $1\frac{1}{2}$ cm. longis 9 mm. latis, apice acutis, basi rotundatis, nodis 3–4 compositis, ad nodos squamatis, ad apicem 2-foliatis. Folia duo, terminalia membranacea lineari-lanceolata vel linearia 30 cm. longa, 4–6 mm. lata apice acuminata, basi gradatim attenuata ad petiolum 3–6 cm. longum abeuntia, laminis nervoso-plicatis cum petiolis articulatis, petiolis basi non dilatata. Scapi erecti folium in longitudine æquantes, e nodis (justa terminalem) oriundi, basi 2–3 nodosi, ad nodos vaginati, vaginis 5 cm. longis ore obliquis obtusis, partibus floriferis 10 cm. longis, floribus laxè dispositis a se 1 cm. remotis, bracteis ovatis acutis 2 mm. longis, pedicellis (cum ovariis) 1 cm. longis. Sepala semi-patentia, subaequalia, posticum oblanceolatum 9 mm. longum $1\frac{3}{8}$ mm. latum apice obtusum basi attenuatum non contractum 5-nervium, lateralia obliqua descendente-arcuata vel falcata, plus minus breviora quam postico, 5-nervia. Petala obliqua, leviter falcata oblanceolata apice acuto-obtusa 3-nervia rarius 5-nervia basi attenuata non contracta 8 mm. longa $1\frac{1}{2}$ mm. lata angustiora quam sepalis.

Labellum cuneato-obovatum basi breve unguiculatum $5\frac{1}{2}$ mm. longum 3 mm. latum, unguibus $1\frac{1}{2}$ mm. longis 1 mm. latis, apice 3-lobatum, lobis lateralibus incurvis lunulatis 2 mm. longis $\frac{2}{3}$ mm. latis apice oblique truncatis 2-nerviis, lobo medio unguiculato-cuneato-obovato 5 mm. longo 3 mm. lato 5-nervio apice rotundato margine crispo a medio deorsum subito attenuato unguiculato, basi appendiculis unis lamellatis $1\frac{1}{2}$ mm. longis plicatis instructo. Columna erecto-recurva, labelli dimidium in longitudine æquans, basi leviter alata in pedem brevissimum producta, apice plus minus clavata.

HAB. Rontabunzan, leg. U. MORI, Aprili., 1910.

Differs from the type in having much smaller flowers, less wrinkled tip of lips and much narrower leaves with long attenuated petioles.

Oreorchis Fargesii FINET var. **subcapitata** HAYATA n. v. Terrestis, pseudobulbis, 3-4 nodosis ovoideis $1\frac{1}{2}$ cm. longis 1 cm. latis apice rostratis basi rotundatis ad nodos squamis obtectis. Folia duo, terminalia, basi vaginis involucreta, lineari-lanceolata, (excepte petiolum) 30 cm. longa 12 mm. lata apice acuminata basi attenuata ad petiolum 5 cm. longum abeuntia membranacea nervoso-plicata, cum petiolis articulata. Scapi e nodis iuxta terminalem oriundi, quam foliis breviores, 20-25 cm. longi 3-4 nodosi, ad nodos vaginati, vaginis 4 cm. longis, laminis acutis, partibus floriferis brevibus 2 cm. longis, floribus dense subcapitatum dispositis, pedicellis gracilibus (cum ovariis) 8 mm.-10 mm. longis, bracteis lanceolatis 4 mm. longis. Sepala sub-potentia subæqualia, posticum lanceolatum 11 mm. longum $2\frac{2}{3}$ mm. latum apice obtusum basi plus minus angustum obscure 5-nervium, lateralia quam postico latiora oblique ovato-lanceolata 9 mm. longa $3\frac{1}{2}$ mm. lata distincte 5-nervia apice obtusa basi leviter contracta falcata. Petala oblique oblongo-lanceolata quam sepalis lateralibus angustiora 10 mm. longa 30 mm. lata apice obtusa distincte 5-nervia minute punctata. Labellum cuneato-obovatum basi unguiculatum, (cum unguibus $1\frac{1}{2}$ mm. longis) 8 mm. longum 3 mm. lata ex apice unguis 3-lobatum, lobis lateralibus linearibus 2 mm. longis $\frac{1}{3}$ mm. latis 1-nerviis apice obtusis, lobo medio oblongo-obovata 6 mm. longo 3 mm. lato, margine denticulato-cristato, 5-nervio facie parse punctato-cristato basi medio 1-lamellato-appendiculato, appendiculo plicato lineari

1 mm. longo. Columna brevis 2 mm. longa leviter alata basi auriculata, in pedem brevissimum producta.

HAB. Mt. Rontabm, leg. U. MORI, Aprili., 1910.

Near *O. Fargesii* FINIT, in Bull. Soc. Bot. Fr. (1896) XLIII. p. 697, Pl. XIII; but differs from the type in having lips with oblong middle lobes, much shorter column and punctate petals.

Saccolabium fuscopunctatum HAYATA sp. nov. Epiphytica, caulis prostratis ad nodos radicanlibus foliosis. Folia disticha alterna crassa angulo 90° a caule divaricata angustata vel angustato-oblonga 2 cm. longa vel longiora 4-5 mm. lata desuper arcuata apice acuta basi rotundata subsessilia supra 1-sulcata subtus plus minus convexa, supra fusco-purpureo-punctata, subtus fusco-purpureo-maculato-punctata, vaginis imbricatis cylindraceis 5 mm. longis ore obliquis basi angustis maculato-punctatis. Racemi breves, pauciflorati floribus 1-2. Flores flavescentes rubro-purpureo-punctati, 9 mm. in longo diametro, pedicellis 1 cm. longis, bracteis oblongo-triangularibus obtusis. Sepala patentia reflexa, posticum ellipticum 4 mm. longum 2½ mm. latum apice rotundatum basi truncatum non contractum; lateralibus cum postico æqualibus. Petala sepalis subæqualia. Labellum basi ad columnam adnatum, plus minus cum alis columnæ continuum saccatum, sacco 5 mm. longo punctato-maculato, ore contracto, lamina rotundata 2 mm. in diametro apice brevissime 2-lobata, valde concava, disco ad medium laminae incrassato hirsuto. Columna brevis 1 mm. longa 3 mm. lata, rostellum 2-dentatum.

HAB. Arisan, leg. B. HAYATA et S. SASAKI, Jan., 1912.

Near *S. formosanum*, but differs by the maculated leaves and the much smaller rounded lobes of the labellum. Also near *S. Matsuran* MAK from which this differs by the much larger flowers. It was brought back by myself from Arisan here to the Koishikawa Garden, where it flowered in May, in the green house.

Saccolabium pumilum HAYATA in Tōkyō Bot. Mag. XX. p. 76, et Mater. Fl. Formos. p. 337. Supplementa ad descriptionem originalem: Capsula cylindrico-ovoidea, 15 mm. longa 4 mm. in diametro, apice truncata basi attenuata ad pedicellum abeuntia, triangularis in sectione, (angulis acutis) facie 1-costata, costis prominentibus, pedicellis 1 cm. longis.

HAB. Arisan, Jan., 1912, leg. B. HAYATA at S. SASAKI.

Common in the broad leaved forests in the mountains.

Saccolabium quasipinifolium HAYATA sp. nov. Epiphytica, 4-5 cm. alta, radicibus teretibus incrassatis albicantibus 2 mm. in sectione 20-30 cm. longis undulato-reflexis. Caules dense foliati, 7-8 cm. longi, vaginis foliorum imbricatis. Folia 8-9, disticha alterna acerosa extrorse leviter recurvata subteretia cum vaginis circ. 10 cm. longa, intus (supra) profunde sulcata extus (subtus) rotundata in sectione, apice obtusa vel acuta, basi cum vaginis articulata, extus basi plus minus costata, vaginis dilatatis caulem semi-amplexantibus fusco-purpureo-roseis (explicato) 7 mm. latis glabris. Racemi axillares, 1-2-3-florati, folium in longitudine æquantes, pedunculis 5-6 cm. longis, ad medium bracteis unis instructis, bracteis (non floriferis) vaginiformibus 5-6 mm. longis obtusis. Flores apertientes 2 cm. in longo diametro $1\frac{1}{2}$ cm. in brevi diametro, albo-viridescens basi bracteis unis instructi, bracteis (floriferis) circ. 1 cm. longis florem amplexantibus obtusis, pedicellis (cum ovariis) 8 mm. longis 5-6-sulcatis. Sepalum posticum obovatum 9 mm. longum obtusum basi non contractum 3-nerviis dorso carinato-costatum, lateralibus valde obliquis posticum in longitudine æquantibus acuto-obtusis latere inferiore latioribus dorso 4-carinato-costatis. Petala sepalis subæqualia sed plus minus breviora 3-nervia carinato-costata. Labellum horizontaliter patens 1 cm. longum 3-lobum 1-calcaratum, (calcarei 1- $1\frac{1}{2}$ cm. longo retrorsum recurvo apice obtuso, ore dilatato) lobis lateralibus ad latus faucis calcaris erectis latiusculis oblique triangularibus 4-5 mm. altis basi 6 mm. latis apice obtusis, lobo medio valde convexo 8 mm. longo 6 mm. lato apice obtuso breve 2-apiculato minute denticulato multi-nervio; disco leviter calloso laciniato-lamellato, lamellis 1-2 mm. longis obtusis. Columna 6 mm. longa 3 mm. lata alata, rostellum antice acutum 2-lobum. Anthera rubescens 3 mm. longa $2\frac{1}{2}$ mm. lata antice acuta postice medio 1-costata 1-locularis, pollinia 2 subglobosa sulcata, stipitibus lamellatis linearibus $3\frac{1}{2}$ mm. longis circ. $\frac{1}{2}$ mm. latis basi attenuatis. Capsula cylindrica apice breve basi longe attenuata, 4 cm. longa 8 mm. lata, multi-costata. Semina minuta fusiformia, cum fibris longissimis multis mixta.

HAB. Mt. Arisan, leg. B. HAYATA et S. SASAKI, Jan., 1912.

It grows on a large trunk of a *Quercus* in the broad leaved forests at Nimandaira in Mt. Arisan. It was brought back by myself to the Koishikawa Garden.

Tæniophyllum sp.

HAB. Banchoriō: Kōryōhei, leg. T. KAWAKAMI et U. MORI, Nov., 1907.

The only *Tæniophyllum* from the island. No flowers indeterminable.

Liliaceæ.

Aspidistra attenuata HAYATA sp. nov. Herba perennis. Rhizoma repens incrassatum semi-teres, 1 cm. in diametro supra foliatum subtus radices teretes emittens approximativè nodosum, apice squamis ovatis lanceolatis 10–30 cm. longis basi 4–5 cm. latis instructum, alabastro foliorum conico-ovoideo acuminato, squamis cuspidato-ovatis involucreto. Folia e facie superiore rhizomatum oriunda longe petiolata, cum petiolis 125 cm. longa, laminis oblanceolata 80 cm. longa 8 cm. lata apice acuta basi attenuata ad petiolum gradatim abeuntia utraque glabra plus minus obliqua, costis supra sulcatis, subtus prominentibus, petiolis teretibus 30–40 cm. longis superiore alatis, inferiore supra sulcatis multo-striatis, basi plus minus dilatis, rhizoma semi-amplexantibus. Scapi e latere rhizomatum 1-florati 6 cm. longi graciles erecti basi 2–3 squamati, squamis ovato-triangularibus imbricatis, superiore 1-squamati, (squamis ovatis 1 cm. longis amplexantibus) apice sub floris singulis 1–2-bracteati, bracteis ovatis 1½ cm. longis, alabastrum florum amplexantibus, bracteis squamisque tenuibus nervosis. Perianthium late cylindricum apice campanulatum 2½ cm. longum 2 cm. latum apice 7–8-lobatum, lobis recurvis triangularibus 7–8 mm. longis crassiusculis extus planis intus 3-costatis plus minus tuberculatis, costis deorsum divergentibus ad medium tubi gradatim evanescentibus sursum versus apicem lobi convergentibus, margine tenuibus lamellatis subintegris, sinibus inter lobos spurie plicatis, partibus tubulatis basi leviter cordatis contractis in longitudinali sectione extus planis intus leviter costatis, utraque facie parce nigro-punctatis. Stamina 7–8, lobis perianthii opposita, pulvinis infra medium tubi adnata, sessilia, antheris elongato-oblongis 2½ mm. longis 2-locularibus. Ovarium late conicum 2 mm.

longum basi dilatatum 6 mm. latum apice ad stylum abeans, 4-loculare, loculis 2-seriatim superpositimque 5-6-ovulatis, stylo brevissime columnari 2 mm. longo $2\frac{1}{2}$ mm. lato, stigmatē dilato campanulato 1 cm. longo 6 mm. lato irregulariter plicato 5-6-labato, lobis apice stigmatosis. Baccæ globosæ apice centro cicatricibus stigmatum notatæ virides 2 cm. in diametro. Semina angustato-oblonga complanata 13 mm. longa; embryo cylindricus, tertiam partem seminis æquans.

HAB. Mt. Arisan, leg. B. HAYATA et S. SASAKI, Jan., 1912.

The genus exists in the Eastern Himalaya, China ad Japan. Of all the species recorded from the countries above mentioned, the nearest is *A. dilatior*, from which our plant differs by the much narrower and more attenuate leaves, which are less dark than those of the congener. It grows on shady places at an altitude of 2000 m. near Jurigi in the Arisan-ranges. It becomes less frequent above or under that elevation. So far as I am aware, there exist in Formosa two species of *Aspidistra*. The present plant is quite different from the one that I saw in the neighbourhood of Kōshūn.

Lilium Kanahirai HAYATA sp. nov. Bulbus.... Caulis altus teres basi 12 mm. in diametro sectionis glaber remote foliatus, foliis a se 6 cm. remotis, cicatricibus foliorum semilunatis 5 mm. latis notatus superiore pauciramosus, ramis angulo 45° divaricatis. Folia alterna remota oblongo-lanceolata vel lanceolata apice acuminata basi angustato-acuta 15-18 cm. longa 3-5 cm. lata, infra medium latissima, supra basin angustissima 3-5 mm. lata, ad insertionem plus minus dilatata, 4-6 mm. lata, subsessilia, utraque glabra, subtus pallidiora, utraque pagine tenuiter 5-nervia, inter nervos obscure 1-venulosa, inter venulas et nervos elongato-reticulata. Flores ad apicem ramulorum terminales longe pedunculati, plus minus cernui vel suberecti, patentes, segmentis plus minus inæqualibus lanceolatis, prope basin et versus apicem albis prope medium rubro-purpurascens, costis basi flavo-viridescentibus sursum rubescentibus, prope basin tuberculato-punctatis, tuberculis atro-rubro-purpurascens columnaribus 1-2 mm. longis. Segmenta exteriora quam interioribus leviter angustiora crassiora (in speciminibus exsiccatis plus fuscentibus) oblongo-lanceolata $6\frac{1}{2}$ cm. longa 17 mm. lata apice obtusa basi 3 mm. lata, basi prope costam crassa, segmenta interiora tenuiora latiora oblongo-

lanceolata 6½ cm. longa 2 cm. lata apice obtusissima basi abrupte cuneato-contracta unguiculata, unguibus 3 mm. longis. Stamina erecta, apice recurvato-patentia, filamentis filiformibus 5 cm. longis, viridescentibus, antheris linearibus 17 mm. longis, pollinibus fusco-rubescenscentibus. Ovarium cylindricum 12 mm. longum 4 mm. in diametro sectionis, 6-sulcatum, stylo 4 cm. longo apice plus minus dilatato, stigmatoso.

HAB. Prope Heirinbi, Giran, leg. R. KANAHIRA, Mart., 1912.

Near *L. speciosum*. The lily is named in compliments to Mr. R. KANAHIRA who found the plant on a rock along the road from Heirinbi to Sekigin. The description of colours of the flower are drawn up from a sketch made by him from a living specimen.

Coniferæ.

Cunninghamia Konishii HAYATA in Journ. Linn. Soc. XXXVIII. p. 299, t. 23, et Fl. Mont. Formos. p. 213. Supplementa ad descriptionem originalem. Flores monœcii. Fl. ♂: ad apicem ramorum capitati, capitulis 30-floratis. Alabastrum capitulae florum masculinorum depresso-globosum 8 mm. in diametro 5 mm. longum, foliis minoribus pluriis 1-3 seriatim involueratum. Capitula florum apertientium late globosa cum floribus 2 cm. lata 1 cm. longa. Flores uni-bracteati. Bracteis (involucris) exterioribus ∞ vacuis pluri-seriatim imbricatis, bracteis extimis sterilibus triangularibus 3 mm. longis apice breve cuspidatis ad summum obtusis basi dilatatis 2 mm. latis margine ciliatis dorso medio late incrassatis carinatis subglabris, bracteis interioribus fertilibus majoribus late globosis 2½ mm. latis vel triangularibus apice rotundatis ad centrum subito mucronato-cuspidatis; interdum 2-bracteolis intra bracteam singulam sitis, tenuibus quam bractea paulo minoribus margine denticulatis apice rotundatis ad centrum cuspidatis glabris. Stamina columnæ cum staminibus laxè cylindracea 9 mm. longa 2-3 mm. in diametro sectionis, pedicellis filiformibus 3 mm. longis, staminibus 30-50 subspiraliter circa rhachin dispositis, filamentis tenuibus angulo 90° a rhachi divaricatis 1 mm. longis, antherarum connectivorum appendiculis squamiformibus imbricatis ovatis non peltatis 1 mm. longis apice acutis denticulatis rhachi parallelis,

antherarum loculis 2-3, vel semper 3 oblongis $\frac{1}{2}$ mm. longis apice a basi appendiculæ pendulis deorsum 2-valvatis.

HAB. Mt. Randaisan, leg. U. MORI, Juli., 1908, (No. 3360).

The specimen bearing male flowers was for the first time collected by Mr. U. MORI in Mt. Randai, where the plant exists very rarely. So far as we are aware, the mountain is the only locality for this rare conifer. The description of male flowers is given here for the first time, for the completion of the original diagnosis.

Taiwania cryptomerioides HAYATA in Journ. Linn. Soc. XXXVII. p. 331, t. 16, Tōkyō Bot. Mag. XXI. p. 2, t. 1, et Fl. Mont. Formos. p. 215. Supplementa ad descriptionem originalem: Flores monœcii? Fl. ♂: ad apicem ramorum capitulati, floribus 5 in capitulis 1-seriatim circa axem brevissimum verticillatis. Alabastrum capitulae depresso-globosum 3-3½ mm. in diametro 2 mm. longum, basi foliis minoribus 1-2-seriatim involueratum. Capitula florum apertientium cum floribus in circumscriptione oblonga 8 mm. longa, floribus 1-bracteatis et 2-bracteolatis; bracteis 2-seriatis in capitulis dispositis, exterioribus sterilibus, interioribus fertilibus, imbricatis, bracteis exterioribus late triangularibus 2 mm. a basi latis 1½ mm. longis incrassatis apice obtusis dorso plus minus capitatis ± concavis margine minute ciliolatis; interioribus majoribus valde concavis rotundato-triangularibus basi 2½ mm. latis 2 mm. longis apice obtusis ± incrassatis, margine tenuibus ciliolatis, intra 2-bracteolas includentibus, bracteolis rotundatis tenuibus 2½ mm. in diametro margine dorso-fissis, vel denticulato-ciliolatis. Stamina columna laxo cylindracea 5 mm. longa 2½ mm. lata, pedicellis 2 mm. longis ad medium articulatis, partibus infra articulationem validiusculis 1 mm. longis, staminibus 10-15 subspiraliter circa rhachin dispositis, filamentis tenuibus angulo 90° a rhachi divaricatis 1 mm. longis, antherarum connectivorum appendicibus squamiformibus imbricatis rotundatis 1½ mm. in diametro subpeltatis apice rotundatis margine denticulato-ciliolatis rhachi parallelis, antherarum loculis 2-3 ovatis $\frac{2}{3}$ mm. longis a basi appendicis pendulis introrsum dehiscen-
tibus.

HAB. Mt. Arisan, leg. S. SASAKI, Mart., 1911, et K. UIMATSU, Mart., 1912.

Male flowers of this conifer were first collected by Mr. S. SASAKI in 1911 and also by Mr. K. UIMATSU, in the following year, although female flowers had been previously sent to me several times. The description here given will complete the original which lacks an account about male. The male flowers of *Taiwania* are almost the same as those of *Cunninghamia* in the main character, though the number of flowers contained in an involucre is considerably smaller in the former than in the latter. The only point which I can find for distinction between the two genera regarding the structure of male flowers, is that pedicels of the staminal column of the former are jointed on the middle, while those of the latter are not articulated.

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ICONES PLANTARUM FORMOSANARUM.

II.

PLATE I.

Explanation of Pl. I.

Viburnum formosum HAYATA.

- Fig. 1. A branch.
2. A hair on a leaf.
3. A branch of an inflorescence.
4. A flower.
5. An ovary, corolla taken off.
6. A corolla, seen from above.
7. The same, seen from below.
8. Stamens, seen from different sides.





ICONES PLANTARUM FORMOSANARUM.

II.

PLATE II.

Explanation of Pl. II.

Viburnum integrifolium HAYATA.

- Fig. 1. A branch.
2. A portion of inflorescence.
3. Dots on the lower surface of a leaf.
4. A flower-bud.
5. A flower.
6. The same much enlarged.
7. The same, corolla taken off, bracts are seen.
8. 9. 10. Stamens, seen from diferent sides.
11. A stigma.



ICONES PLANTARUM FORMOSANARUM.

II.

PLATE III.

Explanation of Pl. III.

Uncaria Kawakamii HAYATA.

(Owing to the imperfectness of material, analyzed figures are not given here.).



ICONES PLANTARUM FORMOSANARUM.

II.

PLATE IV.

Explanation of Pl. IV.

Mussenda kotensis HAYATA.

Owing to the imperfectness of material, analyzed figures are
not given.



ICONES PLANTARUM FORMOSANARUM.

II.

PLATE V.

Explanation of Pl. V.

Blumea conspicua HAYATA.

- Fig. 1. Basal part of a stem.
2. A leaf.
2 *a.* Part of an inflorescence.
3. A head.
4. A perfect flower.
5. The pistil of the same.
6. Stamens.
7. A female flower.
8. The pistil of the same.
9. A seta.
10. A portion of the same, much more magnified.



ICONES PLANTARUM FORMOSANARUM.

11.

PLATE VI.

Explanation of Pl. VI.

Senecio monanthus DIELS.

- Fig. 1. Plant.
2. A head with two flowers.
 3. A head with one flower.
 4. A flower.
 5. A flower, corolla expanded, showing a style and stamens.
 6. The same, setae partly taken off, showing style and stylophore.
 7. Apical portion of a style.
 8. A seta.
 9. A portion of the same.



ICONES PLANTARUM FORMOSANARUM.

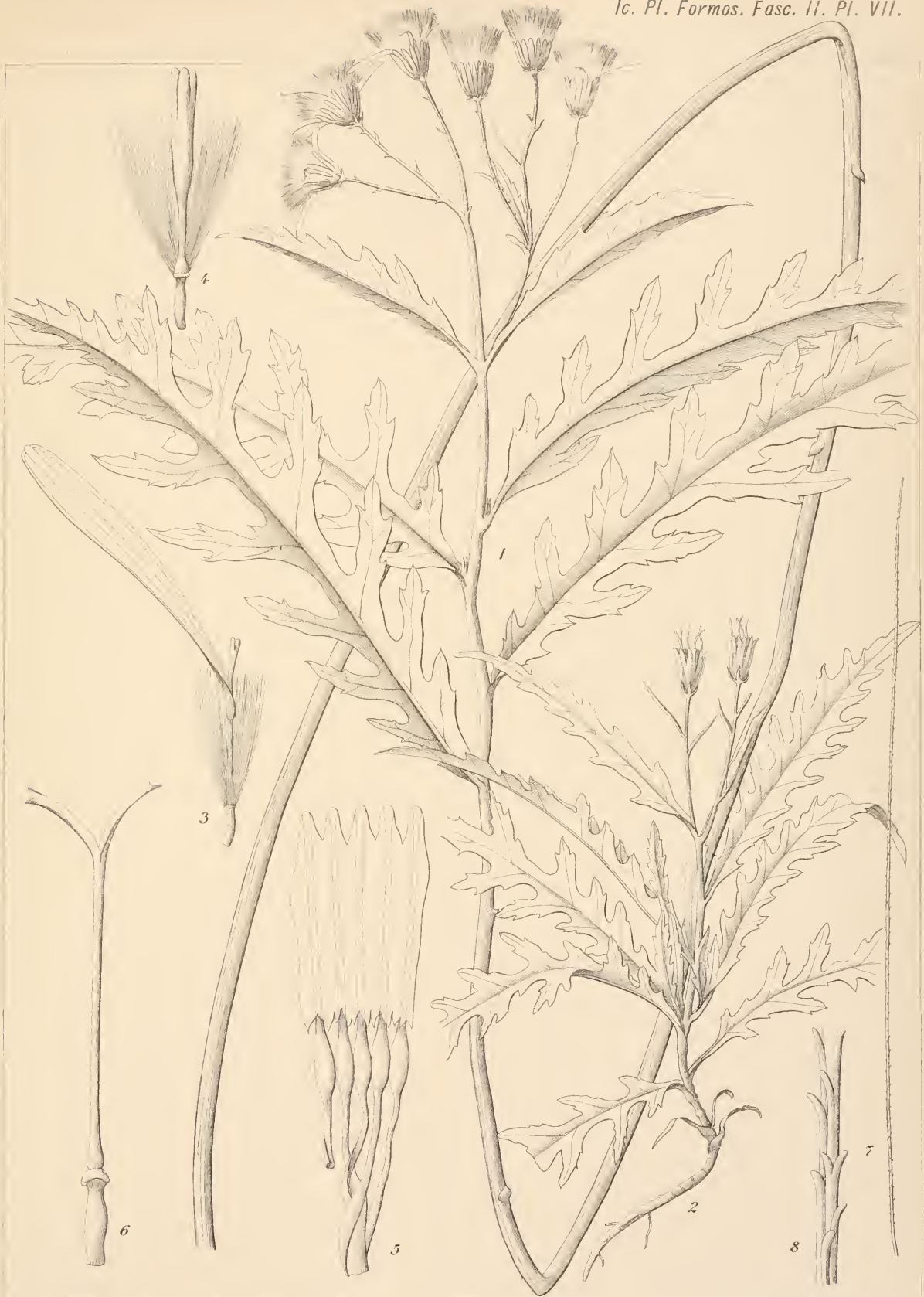
II.

PLATE VII.

Explanation of Pl. VII.

Senecio morrisonensis HAYATA.

- Fig. 1. Plant.
2. A dwarf form of it.
3. A margin flower.
4. A perfect flower.
5. Stamens.
6. A pistil.
7. A seta.
8. A portion of the same (more magnified.)





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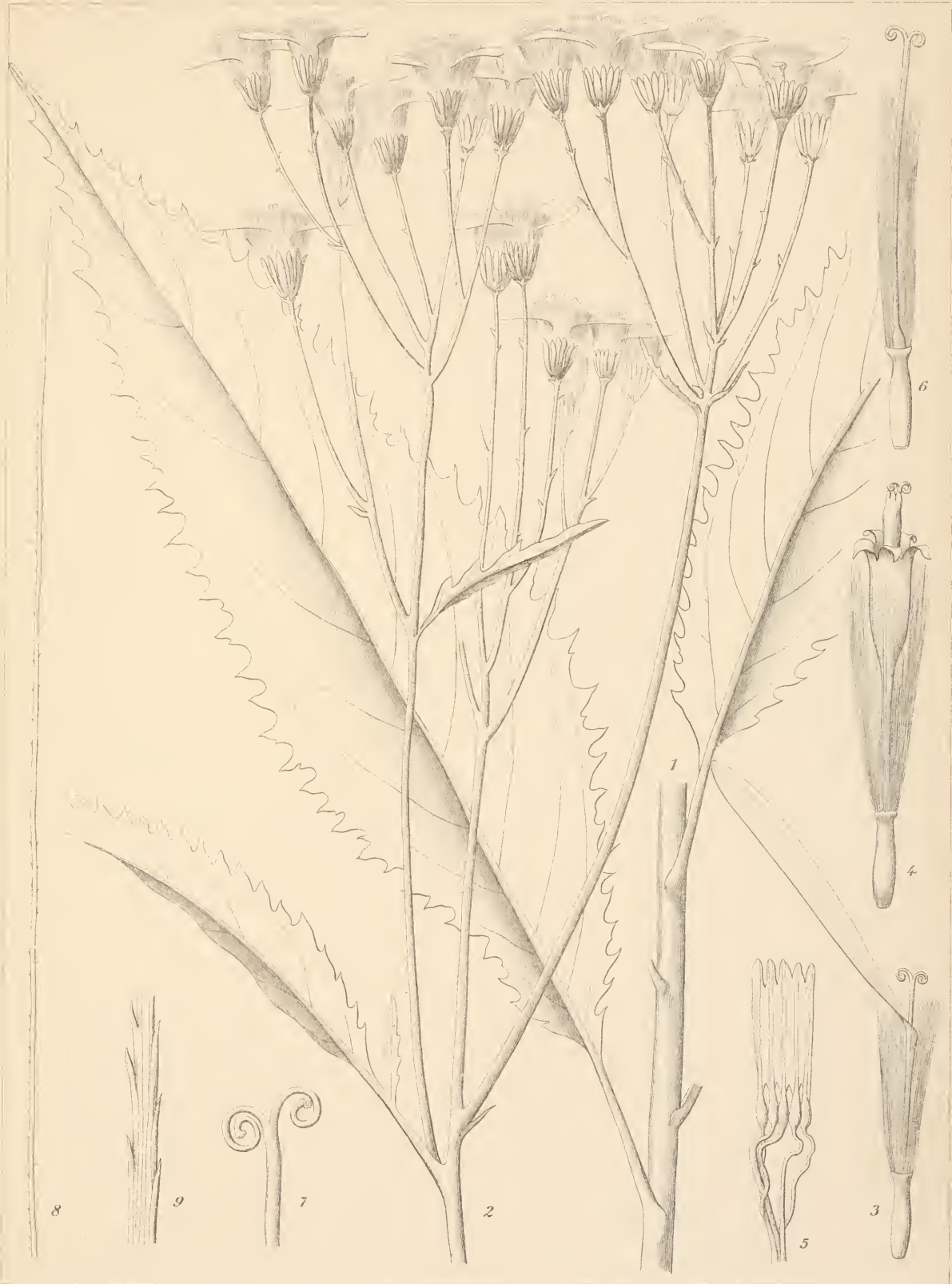
II.

PLATE VIII.

Explanation of Pl. VIII.

Senecio tozomensis HAYATA.

- Fig. 1. A part of a stem.
2. Apical portion of a stem with flowers.
3. A margin flower.
4. A disc flower.
5. Stamens.
6. A disc flower, pappus partly, corolla and stamens entirely,
taken off.
7. Apical portion of a style.
8. A sata of pappus.
9. A portion of a sata, greatly magnified.



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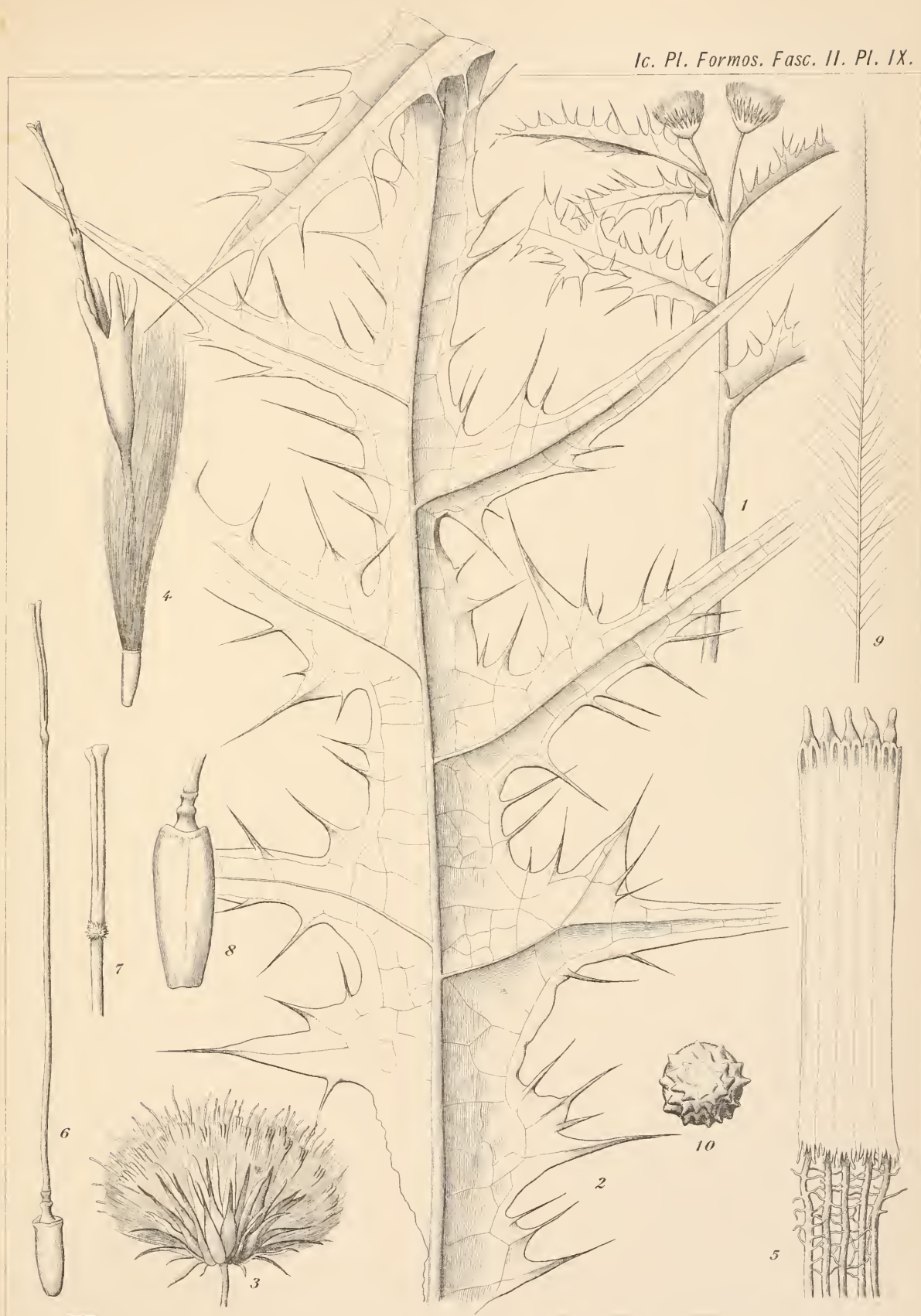
II.

PLATE IX.

Explanation of Pl. IX.

Circium Karakamii HAYATA.

- Fig. 1. A portion of a stem with heads. (much diminished.)
2. A leaf (natural size.)
3. A head.
4. A flower.
5. Stamens (expanded.)
6. A gynæceum.
7. Apical portion of a style.
8. An ovary with the basal portion of a style.
9. A seta.
10. A pollen.



• ICONES PLANTARUM FORMOSANARUM.

II.

PLATE X.

Explanation of Pl. X.

Adenophora morrisonensis HAYATA.

- Fig. 1. Basal portion of a stem.
2. Upper portion of a stem.
3. A flower, corolla, stamens and a part of calyx-lobes taken off.
4. Stamens, seen from different sides.
5. Stigmatic portion of a style.
6. Vertical section of an ovary.



ICONES PLANTARUM FORMOSANARUM.

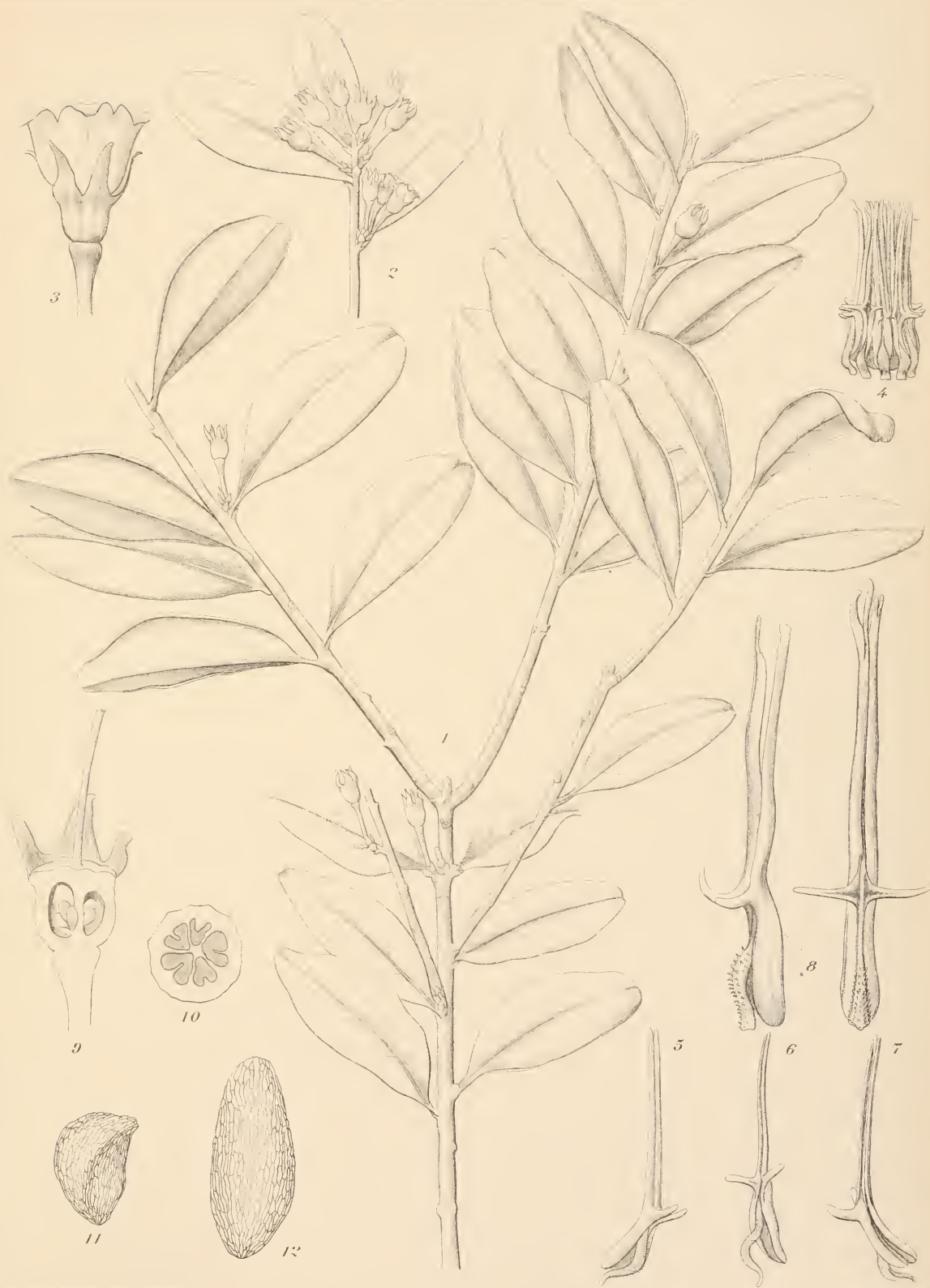
II.

PLATE XI.

Explanation of Pl. XI.

Vaccinium emarginatum HAYATA.

- Fig. 1. A branch.
2. A branch with flowers.
3. A flower.
4. Stamens.
5. 6. 7. Stamens seen from different sides.
8. The same (much more magnified).
9. An ovary in vertical section.
10. The same in transversal section.
11. 12. Seeds of different shapes.



ICONES PLANTARUM FORMOSANARUM.

II.

PLATE XII.

Explanation of Pl. XII.

Vaccinium japonicum MIQ. var. *lasiostemon* HAYATA.

- Fig. 1. A branch.
2. A leaf.
3. A flower.
4. The same, corolla and stamens taken off.
5. Corolla with stamens.
6. A stamen.
7. The same, seen from a different side.
8. An ovary, in vertical section.



ICONES PLANTARUM FORMOSANARUM.

II.

PLATE XIII.

Explanation of Pl. XIII.

Gaultheria Cumingiana VIDAL.

- Fig. 1. A branch.
2. A flower with bracts.
2* A bract.
3. Corolla.
4. 5. Stamens seen from different sides.
6. Calyx after corolla fallen.
7. A fruit.
8. The same, seen from a different side.
9. A seed.
10. An albumen.
11. An embryo.



ICONES PLANTARUM FORMOSANARUM.

II.

PLATE XIV.

Explanation of Pl. XIV.

Pieris taiwaniana HAYATA.

- Fig. 1. A branch.
2. A leaf, seen from above.
3. The same, seen from below.
4. A flower.
5. A flower, part of corolla taken off, showing stamens.
6. Vertical section of the same, corolla and stamens taken off.
7. 8. Stamens seen from different sides.
9. 10. 11. Transverse sections of an ovary.
12. A fruit.
13. A seed.
14. An albumen.
15. An embryo.



ICONES PLANTARUM FORMOSANARUM.

II.

PLATE XV.

Explanation of Pl. XV.

Rhododendron Kawakamii HAYATA.

- Fig. 1. A branch.
2. A leaf, seen from above.
3. The same, seen from below.
4. 5. Dots on the lower surface of a leaf.
6. An outer-most bract of a flower-cluster.
7. 8. Bracts of the inner series :
9. An inner-most bract.
10. 11. Flowers.
12. An calyx-lobe.
13. Corolla, (expanded.).
14. 15. Stamens, seen from different sides.
16. An ovary.
17. An ovary, disc-glands seen.
18. A fruit.
19. The same, valves expanded.
20. 21. Seeds of different shapes.
22. An albumen.
23. An embryo.
24. The same, greatly magnified.



ICONES PLANTARUM FORMOSANARUM.

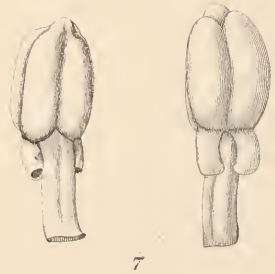
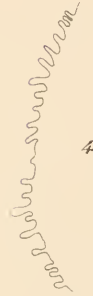
II.

PLATE XVI.

Explanation of Pl. XVI.

Chimaphila rhombifolia HAYATA.

- Fig. 1. Plant.
2. A flower-bud.
3. A flower.
4. Margin of a sepal.
5. Corolla.
6. A corolla-lobe.
7. Stamens, seen from different sides.
8. A flower, corolla taken off, showing an ovary.
9. A stigma.



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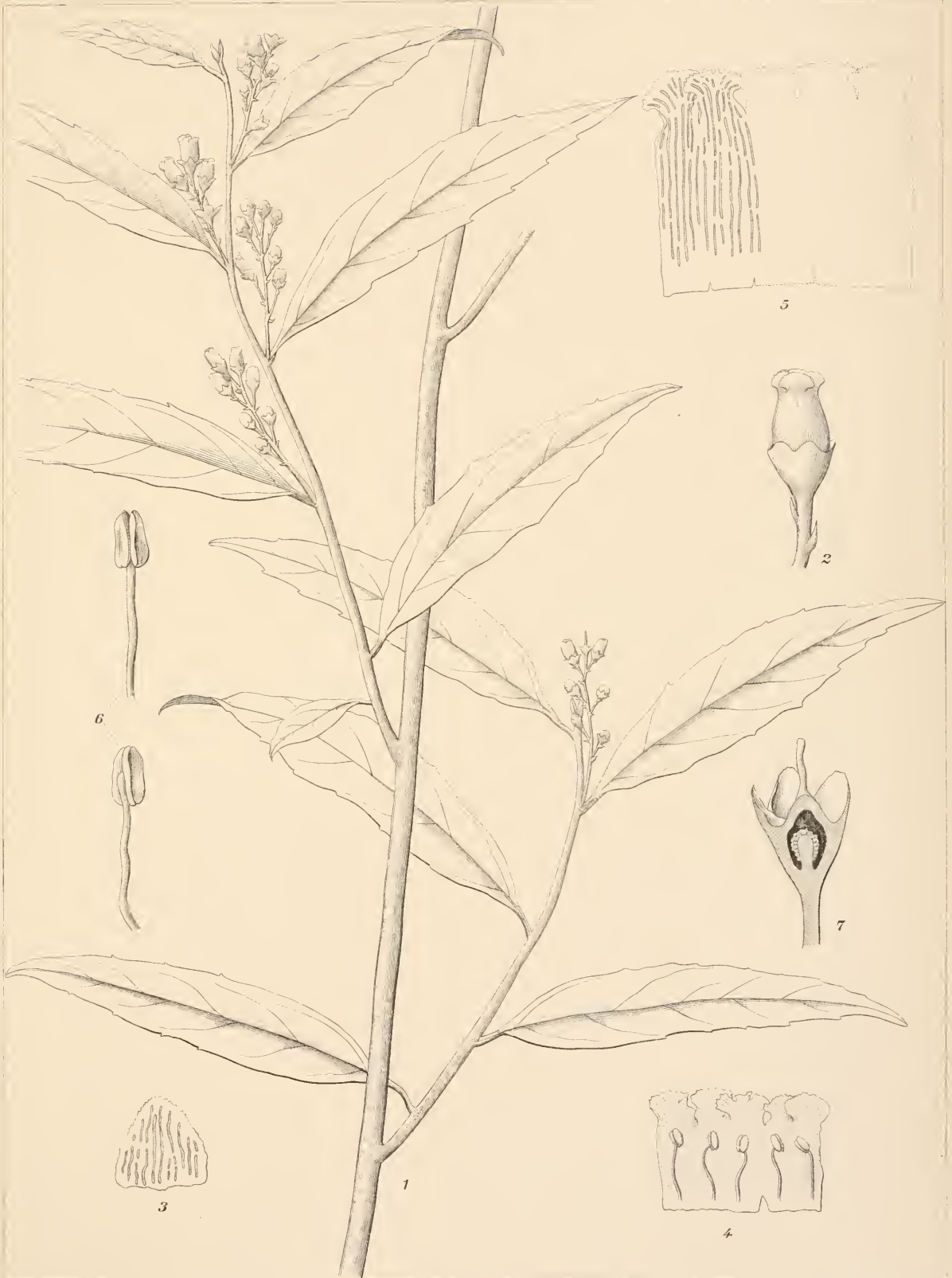
II.

PLATE XVII.

Explanation of Pl. XVII.

Mæsa randuensis HAYATA.

- Fig. 1. A branch.
2. A flower.
3. A calyx lobe.
4. Corolla (expanded).
5. The same, more magnified.
6. Stamens, seen from different sides.
7. An ovary.





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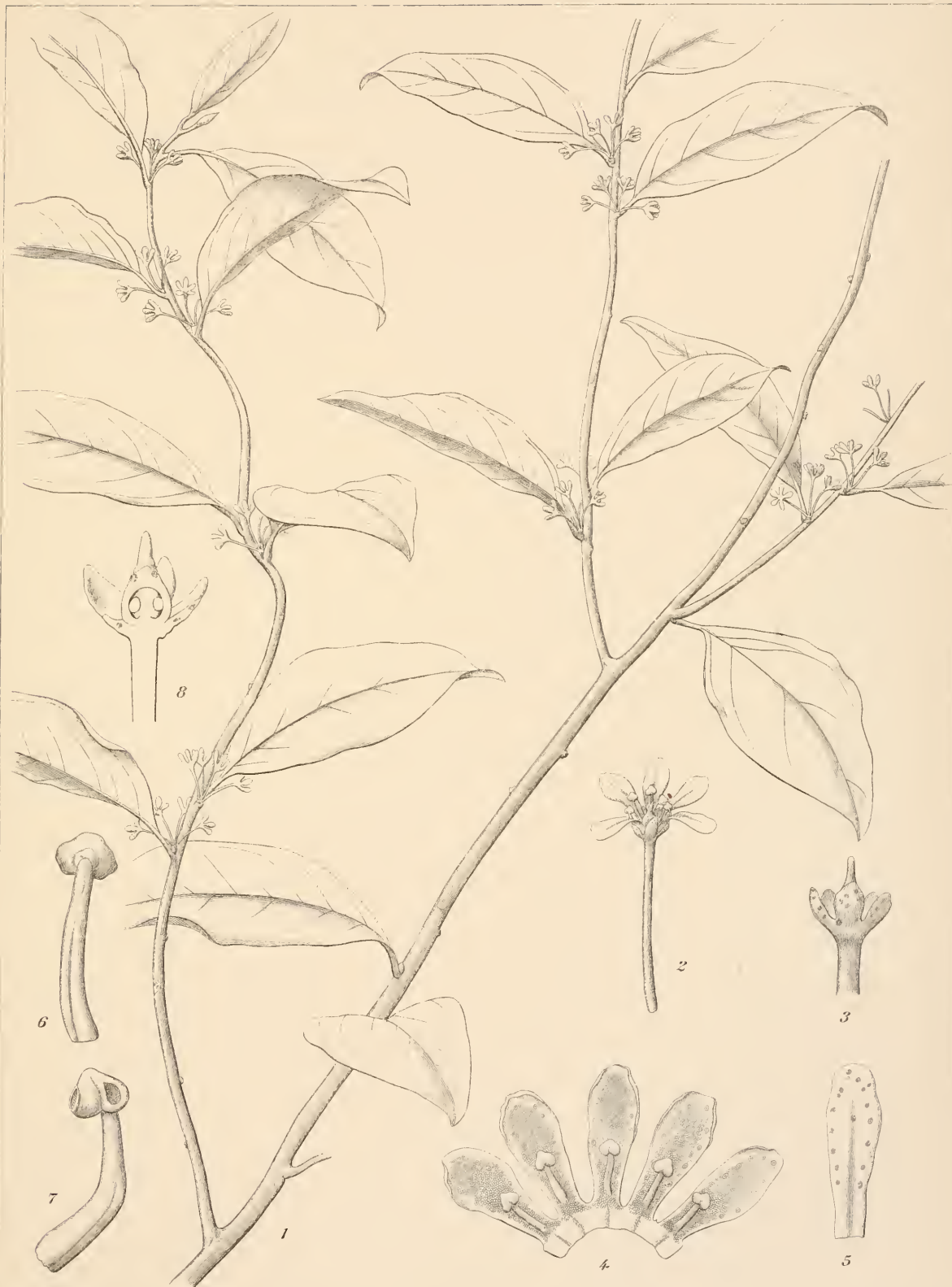
II.

PLATE XVIII.

Explanation of Pl. XVIII.

Myrsine marginata MEZ.

- Fig. 1. A branch.
2. A flower.
3. A flower, corolla taken off.
4. Corolla.
5. A corolla-lobe.
6. 7. Stemens seen from different sides.
8. An ovary (vertical section.).



ICONES PLANTARUM FORMOSANARUM.

II.

PLATE XIX.

Explanation of Pl. XIX.

Symplocos arisanensis HAYATA.

- Fig. 1. A branch.
2. 3. Bracts of different shapes.
4. 5. A flower seen from different sides.
6. The same, in a vertical section.
7. Stamens, seen from different sides.
8. An ovary.
9. Transverse section of the same.



ICONES PLANTARUM FORMOSANARUM.

II.

PLATE XX.

Explanation of Pl. XX.

Symplocos modesta BRAND.

- Fig. 1. A branch.
2. A flower.
3. Corolla, expanded.
4. Stamens, seen from different sides.
5. An ovary in vertical section.
6. Transverse section of the same.



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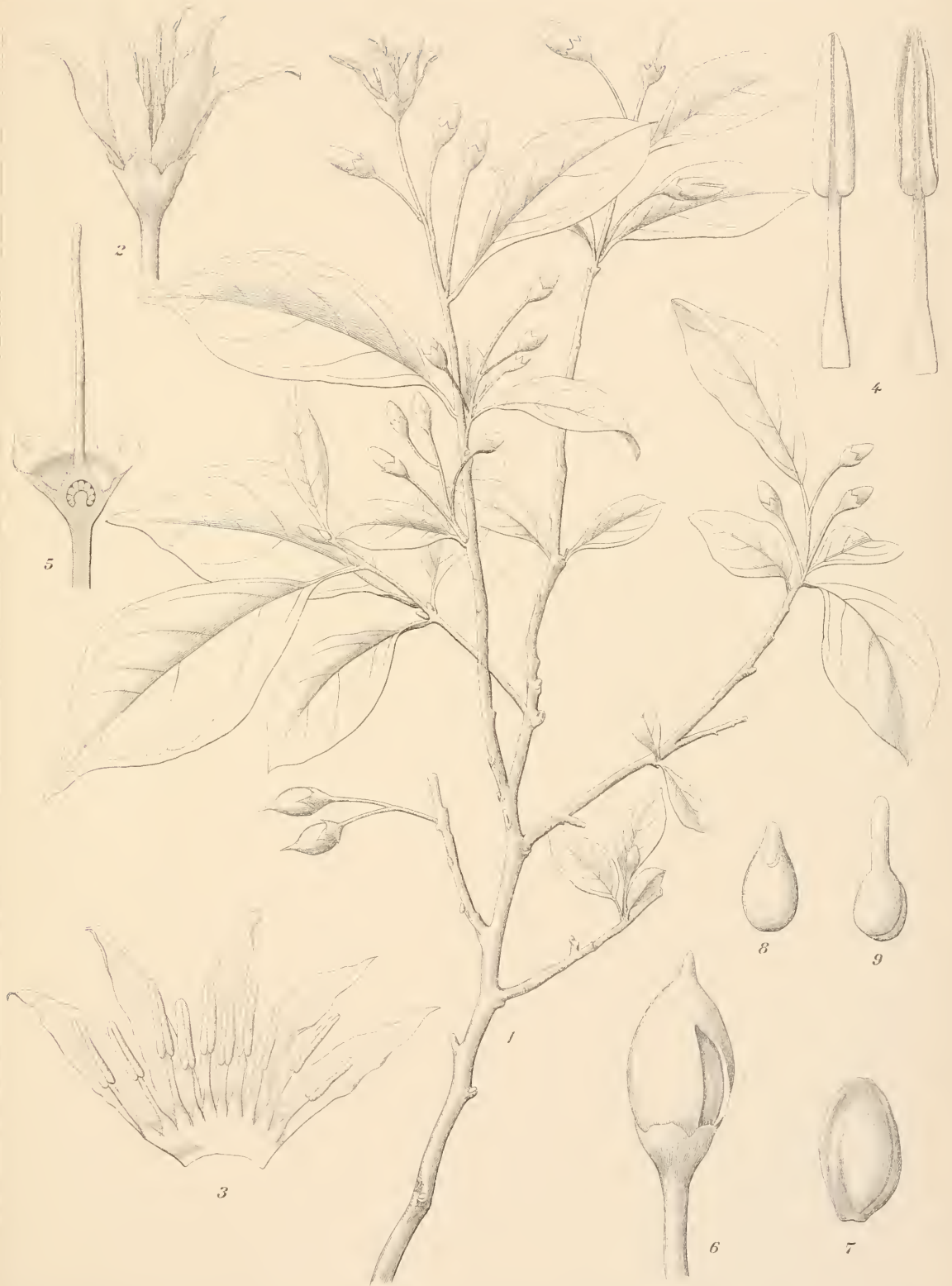
II.

PLATE XXI.

Explanation of Pl. XXI.

Styrax formosana MATSUM.

- Fig. 1. A branch.
2. A flower.
3. Corolla.
4. Stamens.
5. An ovary in vertical section.
6. A fruit.
7. A seed.
8. An albumen.
9. An embryo.



ICONES PLANTARUM FORMOSANARUM.

II.

PLATE XXII.

Explanation of Pl. XXII.

Styrax Malsumureana PERK.

- Fig. 1. A branch.
2. A flower.
3. Calyx.
4. A hair on the calyx.
5. Corolla expanded, showing stamens.
6. Stamens seen from different sides.
7. An ovary in vertical section.



ICONES PLANTARUM FORMOSANARUM.

II.

PLATE XXIII.

Explanation of Pl. XXIII.

Elaeagnus formosana HAYATA.

- Fig. 1. A branch.
2. A leaf.
3. 4. Flowers.
5. Corolla expanded, showing stamens.
6. Corolla lobes, seen from different sides.
7. 8. Stamens, seen from different sides.
9. An ovary.
10. Transverse section of the same.



ICONES PLANTARUM FORMOSANARUM.

II.

PLATE XXIV.

Explanation of Pl. XXIV.

Osmanthus lanceolatus HAYATA.

- Fig. 1. A branch.
2. Bracts of different shapes.
3. A flower.
4. Corolla expanded.
5. A flower, corolla taken off.
6. Stamens seen from different sides.
7. Ovaries seen from different sides.
8. An ovary in transverse section.



ICONES PLANTARUM FORMOSANARUM.

II.

PLATE XXV.

Explanation of Pl. XXV.

Craufurdia lanceolata HAYATA.

- Fig. 1. The plant.
2. Calyx expanded, seen from the outer side.
3. Corolla expanded.
4. A stamen.
5. Stamens, seen from different sides.
6. An ovary.
7. The same, much more magnified.



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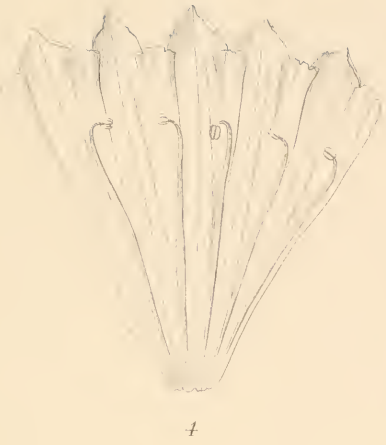
II.

PLATE XXVI.

Explanation of Pl. XXVI.

Gentiana parvifolia HAYATA.

- Fig. 1. The plant.
2. A leaf.
3. Calyx expanded, seen from without.
4. Corolla expanded.
5. A stamen.
6. Stamens, seen from different sides.
7. An ovary.
8. Apical portion of the style.



ICONES PLANTARUM FORMOSANARUM.

II.

PLATE XXVII.

Explanation of Pl. XXVII.

Swertia arisanensis HAYATA.

- Fig. 1. Basal portion of a stem.
2. Upper portion of a stem.
3. A flower.
4. Calyx expanded.
5. Corolla expanded.
6. A corolla-lobe.
7. A hair around a foveola on a petal.
8. Stamens, seen from different sides.
9. An ovary.
10. Capsule.
11. 12. Seeds of different shapes.



ICONES PLANTARUM FORMOSANARUM.

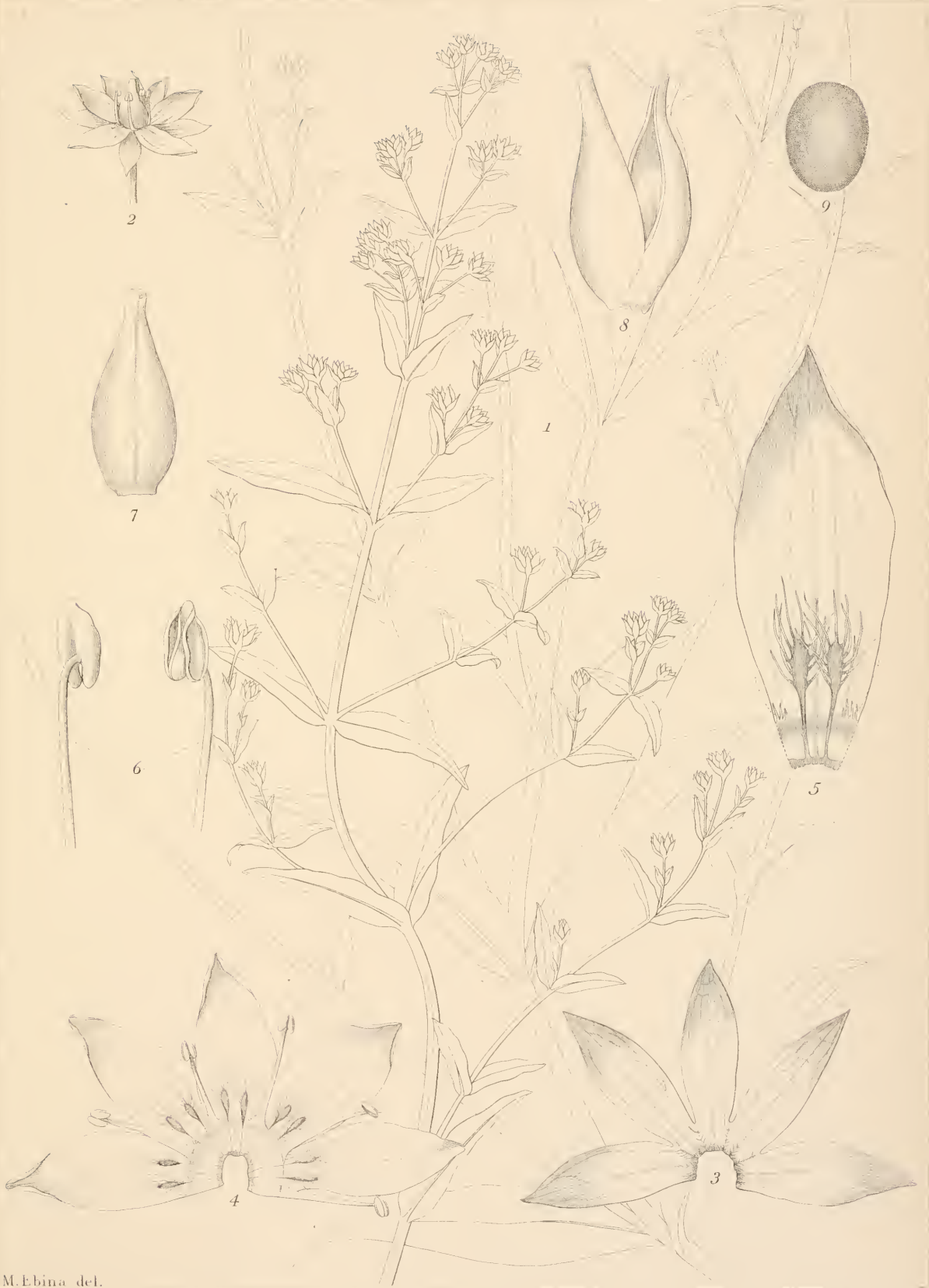
II.

PLATE XXVIII

Explanation of Pl. XXVIII.

Swertia randaicensis HAYATA.

- Fig. 1. The plant.
2. A flower.
3. Calyx expanded.
4. Corolla expanded.
5. A corolla-lobe.
6. Stamens, seen from different sides.
7. An ovary.
8. A capsule.
9. A seed.



ICONES PLANTARUM FORMOSANARUM.

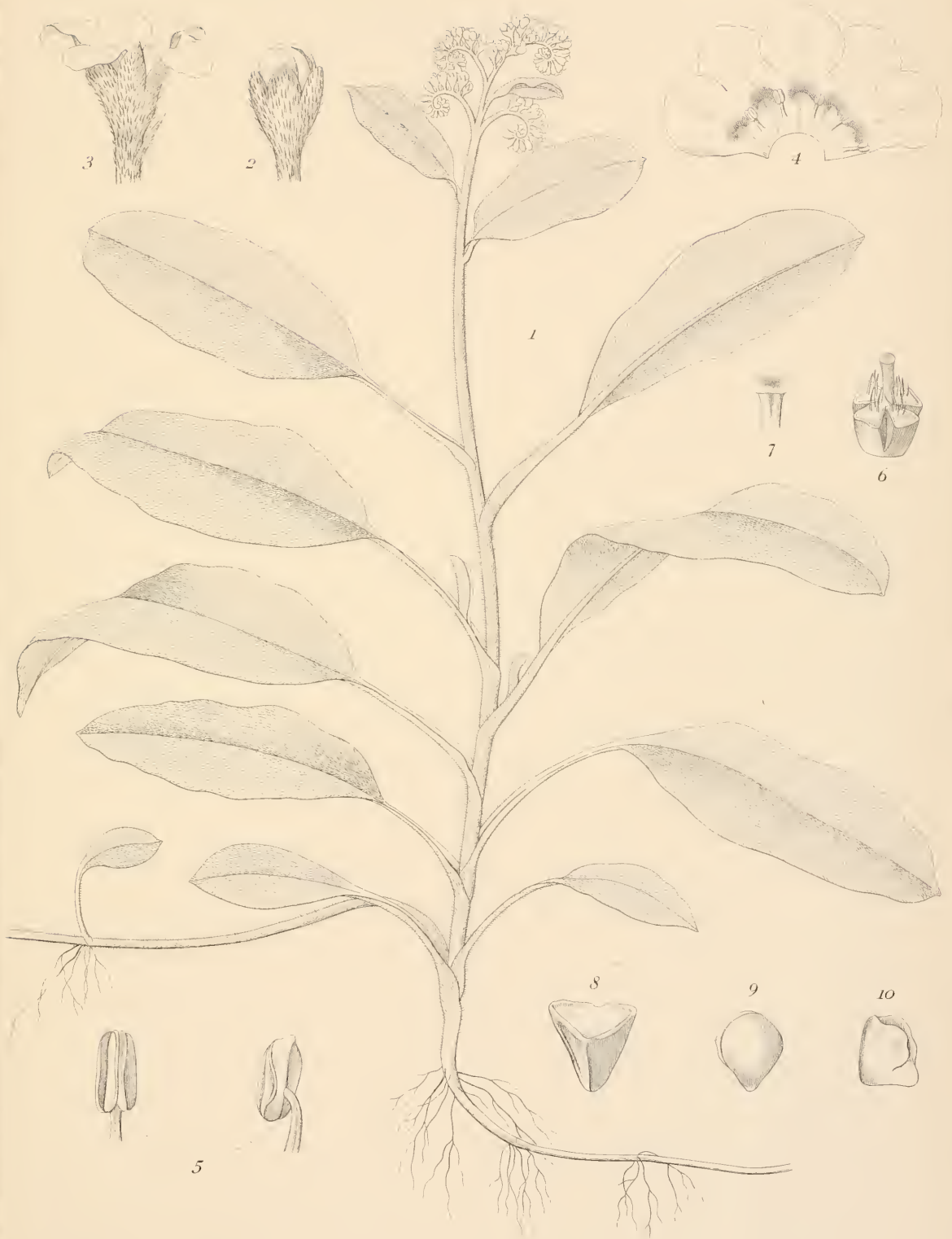
II.

PLATE XXIX.

Explanation of Pl. XXIX.

Trigonotis formosana HAYATA.

- Fig. 1. The plant.
2. A flower-bud.
3. A flower.
4. Corolla expanded.
5. Stamens, seen from different sides.
6. An ovary.
7. Stigma.
8. A nutlet.
9. 10. Embryos, seen from different sides.



ICONES PLANTARUM FORMOSANARUM.

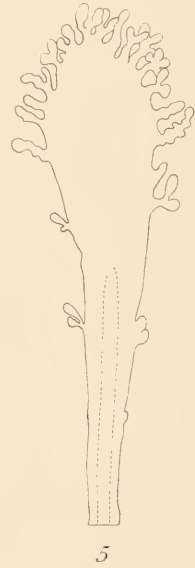
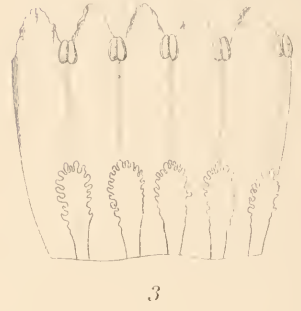
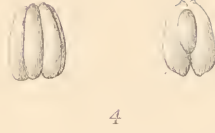
II.

PLATE XXX.

Explanation of Pl. XXX.

Cuscuta formosana HAYATA.

- Fig. 1. The plant.
2. A flower.
3. Corolla expanded.
4. Stamens, seen from different sides.
5. An appendage within corolla-tube.
6. An ovary.
7. Vertical section of the same.
8. Cross section of the same.
9. Apical portion of a style.
10. Two ovules in a cell, (front view.).
11. An ovule showing its attachment.



ICONES PLANTARUM FORMOSANARUM.

II.

PLATE XXXI.

Explanation of Pl. XXXI.

Utricularia biflora HAYATA.

- Fig. 1. The plant.
2. A flower.
3. The same, calyx taken off.
4. An ovary with the calyx, calyx expanded.
5. The same, with bracts.



ICONES PLANTARUM FORMOSANARUM.

II.

PLATE XXXII.

Explanation of Pl. XXXII.

Titanotrichum Oldhami SOLERED.

- Fig. 1. A specimen of the plant.
2. Another specimen bearing deformed flowers.
3. A hair on leaves.
4. Portion of a spike with deformed flowers.
5. A segment of a deformed flower.
6. A flower.
7. Corolla expanded.
8. An ovary.
9. The same, in transverse section.
10. A capsule in calyx.
11. The same, taken out.



ICONES PLANTARUM FORMOSANARUM.

II.

PLATE XXXIII.

Explanation of Pl. XXXIII.

Lepidagathis formosensis CLARKE.

- Fig. 1. Basal portion of a stem.
2. Apical portion of the same.
3. 4. Flowers.
5. Corolla, expanded.
6. Stamens, seen from different sides.
7. An ovary.
8. Apical portion of a style.
9. A fruit.
10. A seed.
11. Portion of a seed-coat, showing hairs on it.
12. An embryo.



ICONES PLANTARUM FORMOSANARUM.

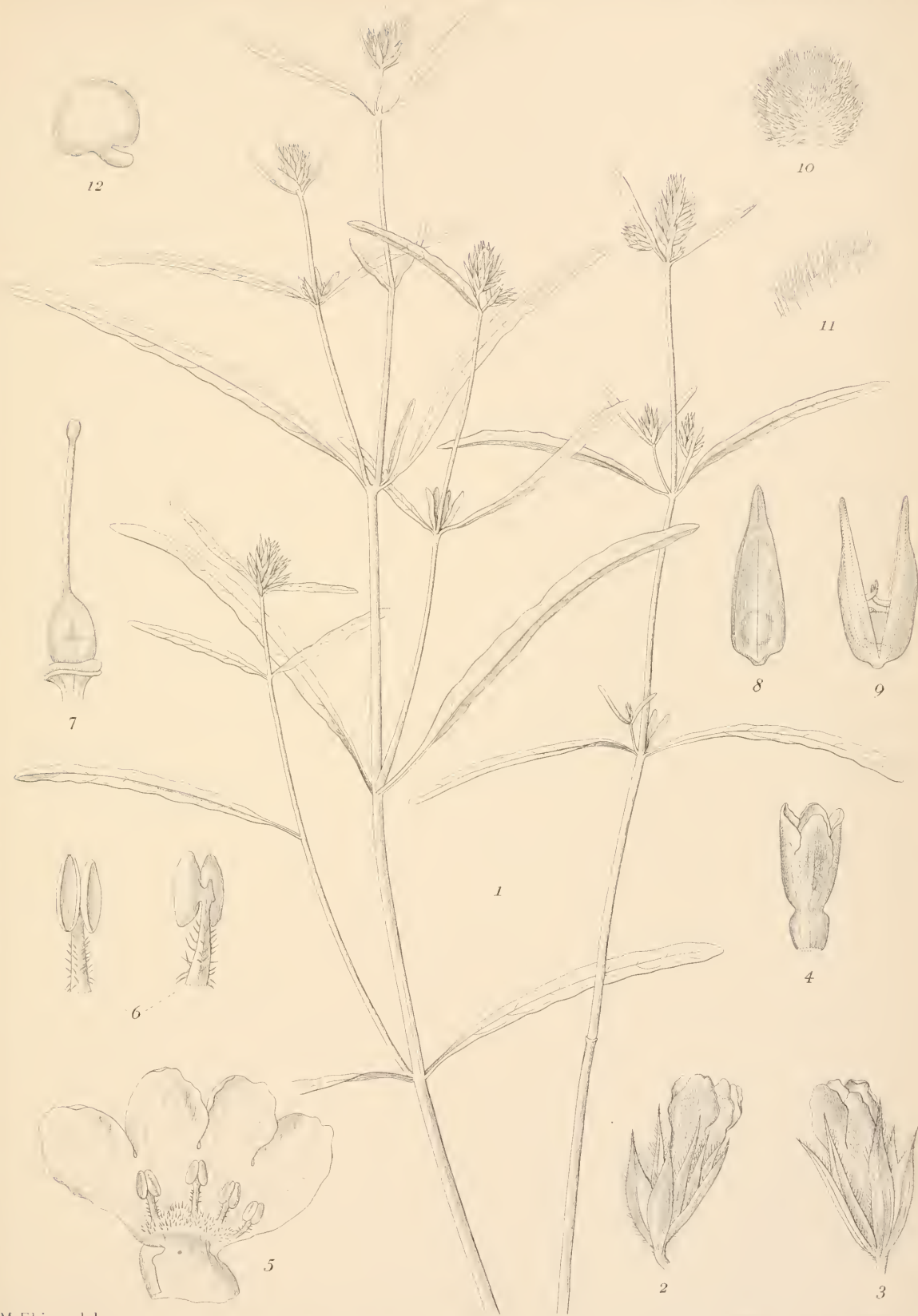
II.

PLATE XXXIV.

Explanation of Pl. XXXIV.

Lepidagathis stenophylla CLARKE.

- Fig. 1. The plant.
2. 3. A flower seen from different sides.
4. Corolla.
5. The same, expanded.
6. Stamens seen from different sides.
7. An ovary.
8. A capsule.
9. The same, after dehiscence.
10. A seed.
11. Portion of the seed-coat, showing hairs on it, greatly magnified.
12. An embryo.





ICONES PLANTARUM FORMOSANARUM.

II.

PLATE XXXV.

Explanation of Pl. XXXV.

Callicarpa kotensis HAYATA.

- Fig. 1. A branch of the plant.
2. A flower.
3. A hair on the calyx.
4. Corolla, expanded.
5. Stamens, seen from different sides.
6. A pistil.
7. Apical portion of the style.



ICONES PLANTARUM FORMOSANARUM.

II.

PLATE XXXVI.

Explanation of Pl. XXXVI.

Callicarpa longifolia HAM. var. *longissima* HEMSLE.

- Fig. 1. A branch of the plant.
2. A flower.
3. A corolla (expanded.)
4. Stamens, seen from different sides.
5. An ovary.
6. Apical portion of the style.



ICONES PLANTARUM FORMOSANARUM.

II.

PLATE XXXVII.

Explanation of Pl. XXXVII.

Callicarpa parvifolia HAYATA.

- Fig. 1. A branch.
2. A flower.
3. Corolla.
4. Stamens, seen from different sides.
5. An ovary.
6. Apical portion of a style,





ICONES PLANTARUM FORMOSANARUM.

II.

PLATE XXXVIII.

Explanation of Pl. XXXVIII.

Callicarpa randaiensis HAYATA.

- Fig. 1. The plant.
2. A flower.
3. Corolla.
4. Stamens, seen from different sides.
5. An ovary, in vertical section.



ICONES PLANTARUM FORMOSANARUM.

11.

PLATE XXXIX.

Explanation of Pl. XXXIX.

Clerodendron glaberrima HAYATA.

- Fig. 1. A branch of the plant.
2. An inflorescence.
3. A flower.



ICONES PLANTARUM FORMOSANARUM.

II.

PLATE XL.

Explanation of Pl. XL.

Clerodendron kosutanense HAYATA.

- Fig. 1. A branch of the plant.
2. 3. Flowers.
4. 5. Stamens, seen from different sides.
6. An ovary
7. The same, much more magnified.
8. Apical portion of a style.

